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Academic Contributions to the UNESCO 2019 Forum on Education for Sustainable Development and Global Citizenship

Edited by

Quan-Hoang Vuong, Le Anh Vinh and Tran Trung

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UNESCO 2019 Forum on Education
for Sustainable Development and
Global Citizenship**

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About the Editors

Quan-Hoang Vuong (Ph.D.) has been the Founding Director of the Centre for Interdisciplinary Social Research at Phenikaa University in Hanoi, Vietnam since 2017, and has served as Senior Researcher at the Centre Emile Bernheim de Recherche Interdisciplinaire en Gestion (CEBRIG), Université Libre de Bruxelles, Belgium since 2003. He has (co)authored over 150 journal articles, book chapters, and books, including ones in the world's leading journals such as *Nature*, *Nature Human Behaviour*, *Scientific Data*, *International Journal of Intercultural Relations*, *Studies in Higher Education*, and *Palgrave Communications*, to name just a few. He is also the Lead Editor of the book *The Vietnamese Social Sciences at a Fork in the Road*, published by De Gruyter, Sciendo imprint in 2019.

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Preface to “Academic Contributions to the UNESCO 2019 Forum on Education for Sustainable Development and Global Citizenship”

International initiatives on orientating education toward sustainable development can be traced back to a proposal by the United Nations Educational, Scientific, and Cultural Organization (UNESCO) in 1995. According to this framework, UNESCO suggested reorienting environmental education and reshaping the educational process so as to build a more sustainable relationship between humans and the environment. Twenty-five years have passed, and much of this pursuit is still ongoing, with many unanswered challenges. In recognition of the importance of education and sustainable development, this book brings into focus some valuable insights from the perspective of a developing country, Vietnam. It is a collected volume of academic contributions to the UNESCO 2019 Forum on Education for Sustainable Development and Global Citizenship, organized on July 2–3, 2019, by UNESCO in conjunction with the Ministry of Education Training (MOET) of Vietnam.

The articles included in this book may differ in their substance but altogether provide deep reflections on concrete measures to achieve the United Nations Sustainable Development Goals (SDGs), particularly SDG4 on quality education. These studies have looked at international students, overseas Vietnamese students, domestic Vietnamese students, academics, and even young children in terms of subjects. The research scope covers the high school to higher education levels, shedding a new light on a diverse set of mental health problems, student loyalty, administrative management, academic publishing, reading habits and school performance, acculturation, and legal rights. Additionally, there is also a timely take on the early impacts of the new coronavirus (COVID-19) pandemic on learning behaviors in terms of school closures. Given the uncertainty caused by COVID-19 worldwide, academics and policy makers may glean meaningful insights from how the temporary shutdowns of educational institutions in Vietnam have disrupted learning.

The book presents new findings as much as it inspires readers to think more creatively about the concepts of “sustainable development” and “sustainability.” For instance, Lai, Pham, Nguyen, Nguyen, and Le suggest applying this concept to international students’ movement between their home countries and their host countries. If such movement were sustainable, the host countries and universities could benefit significantly from a stable income source, ranking, and future human resources. In a different line of research that also focuses on international students, Nguyen, Serik, Vuong, and Ho point out how poor mental health problems could adversely hurt the sustainability of internationalization in higher education. The concept of sustainability can indeed be applied in other contexts, such as student reading and learning habits and adaptation to socio-cultural settings, as Tran et al. and Su, He, and Hoang have explored, respectively. These approaches highlight that reshaping the whole educational process to meet the sustainability end goal requires an open mindset.

Besides addressing issues faced by students at different levels, the book also has a set of articles analyzing the management of higher education, the culture of international publishing, and the compatibility of the UN SDGs with the legal rights for education of ethnic minorities. In particular, Pham, Nghiem, Nguyen, Mai, and Tran reveal the impacts of rapid economic growth and the heightening pressures to produce quality human resources from mid-level academic managers in Vietnam. Meanwhile, Tran, Trinh, Le, Hoang, and Pham use a structured communication technique—the Delphi method—to identify the key determinants of success in international academic

publishing. And lastly, Do, Hoang, Le, and Tran investigate the conditions and barriers to the education of ethnic minorities in Vietnam.

The world is facing numerous challenges, from hyper-connected digital life to the new post-pandemic economic reality. Sustainable education needs to address these challenges. We hope that all of the papers in this volume have provided practical insights as well as opened up room for further dialogues on education and sustainability for developing countries with limited resources.

Quan-Hoang Vuong, Le Anh Vinh, Tran Trung

Editors

Article

Toward Sustainable Learning during School Suspension: Socioeconomic, Occupational Aspirations, and Learning Behavior of Vietnamese Students during COVID-19

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Abstract: The overspread of the novel coronavirus—SARS-CoV-2—over the globe has caused significant damage to manufacturing and service businesses, regardless of whether they are commercial, public, or not-for-profit sectors. While both the short-term and long-term impacts of most companies can be approximately measured or estimated, it is challenging to address the enduring effects of COVID-19 on teaching and learning activities. The target of this research is to investigate students' manners of studying at home during the school suspension time as a result of COVID-19. Through analyzing original survey data from 420 K6–12 students in Hanoi, Vietnam, this work demonstrates the different learning habits of students with different socioeconomic statuses and occupational aspirations during the disease's outbreak. In particular, we featured the differences in students' learning behaviors between private schools and public schools, as well as between students who plan to follow STEM-related careers and those who intend to engage in social science-related careers. The empirical evidence of this study can be used for the consideration of the local government to increase the sustainability of coming policies and regulations to boost students' self-efficacy, as it will affect 1.4 million students in Hanoi, as well as the larger population of nearly 10 million Vietnamese students. These results can also be the foundation for future investigations on how to elevate students' learning habits toward Sustainable Development Goal 4 (SDG4)—Quality Education—especially in fanciful situations in which the regular school operation has been disrupted, counting with limited observation and support from teachers and parents.

Keywords: sustainable education; learning habit; school closure; socioeconomic; occupational aspiration; COVID-19; SDG4; Vietnam; secondary school

1. Introduction

Developing digital competency for the younger generation is always a primary concern of most governments toward Quality Education (Sustainable Development Goal 4) [1]. Educational digital transformation is not a technological renovation, but also a transition between generations. In particular, millennial teachers are taking over baby-boomer teachers, and the new generation of students are “born digital.” Especially in countries that consider technology absorption as a vital sustainable development strategy, educating digital citizens is an essential pillar of the national education strategy [2]. Therefore, standing on the perspective of SDG4, educators should emphasize digital self-efficacy rather than the regular concept of self-efficacy. At a micro-level, teachers’ teaching habits and learners’ learning habits play essential roles in the transformation processes of any educational institution [3]. Romero-Rodríguez et al. [4] underlined the necessity of learners’ self-efficacy and self-regulation toward sustainable academic achievement, especially in e-learning contexts. Concerning students’ self-efficacy as a grand puzzle for their sustainable learning trajectory, several studies have been taken to examine Vietnamese students’ learning habits. Le et al. [2] measured the ICT competencies of Vietnamese students regarding cognitive and non-cognitive skills among various social strata and figured out that even in big cities like Hanoi or Danang, students’ level of e-device usage is not high. Moreover, Vuong et al. [5] provided a mosaic of Vietnamese students’ reading habits and triggered further studies on examining students’ self-efficacy amidst different social and cultural facets. Overall, the importance of self-regulated skills, such as ICT, non-cognitive, and reading habits, need more attention from the government, school managers, teachers, and parents, especially in the urgent circumstances, such as the passive digital transformation due to COVID-19.

The success of students relies a lot on their prior knowledge, teacher and teaching quality, the possibility of accessing possibilities, socioeconomic status (SES), and their effort [6]. Students’ learning habits are caused by and contribute to the students’ intrinsic motivation [7]. However, students do not maintain the same learning habits during the summer, winter, and spring breaks as they do during school. Warner et al. [8] pointed out the significant changes in student learning and sleeping habits during holidays, in which the solid learning hours of school and homework are not maintained regularly. Notably, students’ learning habits are partially distracted by the usage of social networks and entertainment activities at home [9] or suspended by traveling [10]. Notwithstanding, these kinds of degradation effects on learning habits are seasonal and predictable [8]. There is a limited number of studies regarding students’ studying at home behavior during sudden school termination, in which the students are required to stay at home and have to adjust their living and learning habits [11,12]. Due to the pandemic, students also have to face potential mental issues, such as depression, fearfulness, worry, and stigmatization [7,8], which might also affect their learning habits. The longer that COVID-19 lasts, the higher quantity and level of issues and risks the educational system worldwide have to face.

During early January, 2020, the spreading of COVID-19 from Wuhan, China, alerted governments and societies worldwide [13]. Within a month, China locked down ten cities and closed all schools over the country [14], while neighboring countries had various perspectives and approaches toward the issue. Globally, nearly 300 million students were affected by school closure [15]. Countries such as Japan, Iran, Italy, and North Korea applied nationwide school shutdowns, while Vietnam, South Korea, Singapore, Thailand, France, Germany, and the United States adopted a localized school closure policy [16]. Regardless of the size of the pandemic and the debates on school closure policy, pedagogical transformation became a popular topic in most countries [17]. In a short time, various kinds of initiatives to support students and teachers have been released. For instance, top-tier universities, such as Harvard University [18] and Cambridge University [19], delivered guidelines and handbooks to support distance learning. Furthermore, various NGOs (Non-Government Organizations) and NPOs (Non-Profit Organization) provided support and instructions to enhance mental health [20–22]. Ed-tech companies and publishing houses also introduced entirely free or occasionally free accounts and materials from their portfolios and databases [23,24].

This study acknowledges the encouragement of conducting novel research to minimize and prevent the potential effects of SARS-CoV-2, the cause of COVID-19 [23]. Vietnam has managed the infection rate of SARS-CoV-2 despite its limited resources and crowded population [25]. During early February, the country witnessed a controversial topic of closing schools nationwide or not after one extension week of the lunar new year due to COVID-19. Instead of closing schools until 9 February, all schools in over 63 provinces extended the suspension to 16 February, while detailed regulation about online teaching and learning had not yet been released [26]. On 14 February, the Ministry of Health suggested that local departments of education should consider the possibilities of stopping school suspension based on each province's particular situation [27]. After that, on 9 March, several provinces announced one or two additional weeks of school suspension [28]. In Vietnam, the concept of learning is often referred to as learning at school. Regarding this chaotic situation, either the school and teacher or the student and parent were confused about what they should do to ensure students' health and learning quality at the same time. Constructing proper self-learning habits also means consolidating the foundation of life-long learning and individual personality development [29]. The concern of educational quality and students' mental health is not limited to these closure weeks but also extends to this academic year, as well as its effects on the following years [30]. Thus, this research enriches the prior studies on students' learning behaviors during the sudden suspension of school, with empirical evidence from a developing country: Vietnam [31]. Furthermore, the findings of this paper contribute to minimizing the long-term side effects of COVID-19, fostering sustainable education within and beyond school, as well as enhancing capabilities when reacting to similar chaotic situations in the future.

2. Theoretical Background

2.1. Students' Learning Habits

The notion of study habits has been attracting attention from educational researchers for its influence on academic performance for a long time. It is usually discussed with study skills and study attitude, as Crede and Kuncel [32] put all three concepts together into the SHSA (Study habits, skills, and attitudes) construct, or regarded as comprising study skills and attitude in its theory [33]. The definition of study habits in literature can be summarized as consisting of two main features: (i) carefully planned study behaviors, such as note-taking, reviewing learning material, reading, consulting teachers, and arranging a suitable learning space, and (ii) the engagement in study sessions using the mentioned study behaviors [34,35].

Most studies on this topic are devoted to exploring its influence on academic achievement. Most research suggests that learning habits have a positive interrelationship with learning performance [36,37], while some found no relationship [32,38,39]. Nonis and Hudson [40] argue that the nature of this relationship is complicated, and what is considered a good habit is different depending on the situation. The impacts of study habits on test anxiety are matters of concern, with a predominant result of a negative relationship between these two concepts [41]. Although its consequences are discussed quite a lot, few studies focus on factors that influence study habits, and gender difference is the most found factor [35,38].

Time spent studying is a critical component of study habits [34,40]. While time spent studying at school is controlled according to the school's schedule, studying at home is much more unsystematic and is affected by a lot of different factors. The findings on time spent studying at home can be found mostly on the topic of doing homework. However, the concept of doing homework does not cover the time that students spend studying with something other than what the teachers have given out. Wagner et al. [42] pointed out that learning at home includes many types of activities to elevate the overall academic performance, in which homework is just one type of learning, and is limited to the assigned tasks from teachers only. Especially when schools everywhere have to close due to the attack of COVID-19, students have to stay at home, adjust their study habits, and deal with technological challenges at the same time, so studying at home is not all about doing

homework anymore. Lacking understanding of this phenomenon will lead to failures in educational policy and practices, which will cause enormous and long-lasting costs to society [43]. Nonetheless, studies exploring the concept of “working at home for school” are rare despite its importance, and there is no study that investigates the time spent studying during disruptive times, as mentioned before. The relationship between students’ time spent on homework or studying at home and learning results are still being debated. While some scholars found a positive relationship indicating the more time students invest, the better the achievement [44], some found no correlation and argue that time spent on studying only matters when the quality of the study time is taken into consideration [45]. Factors that influence the time spent studying at home are gender differences [42,44], motivation [46], academic interest, school anxiety, and parental pressure [47]. The time spent studying at home is an even more critical matter in Vietnam, as Larson and Verma [48] found a gap in the time spent on schoolwork outside school between East Asian and U.S students, especially in adolescents, in which East Asian adolescents spend substantially more time on academic activity than U.S adolescents.

2.2. Socioeconomic Status and Learning Habits

Le et al. [31] stated the correlation between SES and students’ reading habits and their influence on academic achievement. SES is incorporated by characterizing variables, such as student ages [49], parental education, parental occupational prestige, family income [50,51], and home resources [52,53]. Ensminger et al. [54] concluded that three indicators of SES—education, occupation, and income—are positively correlated.

Besides contributing to the overall SES, each of these components represents a substantially separated aspect of SES based on different empirical studies [55,56]. Blanden and Gregg [57] stated that family income and children’s education were relevant and strengthened through time, and they also found that “income does have a causal impact on educational outcomes.” In addition, parental education was one of the most critical SES elements, as it impacts students from childhood to adolescence and even further [58,59]. In individualistic societies, such as the USA and UK, parental education correlates with parent’s income and [60–62] stated that the insights of particular social strata’s prestige and culture could be reflected through parental occupation. Therefore, Hauser [51] considered parental occupation more important than parental education and income, regarding the weight of these variables toward the overall SES. Furthermore, home resources, such as books, computers, a study room, the availability of Internet [63,64], accessibility of extra educational services [65,66], and a positive home learning environment [67] are essential antecedents to students’ success.

SES had significant indirect effects on the learning habits of children through parental involvement [68]. In general education [69] as well as special education [70], parental involvement strongly affects student learning activities and outcomes. McNeal [71] mentioned that parental involvement has more notable effects on behavioral issues than children’s cognitive outcomes. The higher participation of parents in school activities was observed from families with higher SES [72]. Furthermore, they could provide their children with more exceptional support through discussions and involvements [71] or proper supporting resources and learning conditions [73]. According to a longitudinal research of 10 years by Carter [74], parental support enhances the academic performance of both primary, lower, and upper secondary students. Researchers noticed the compelling impact of family involvement over students’ learning results [75]. Besides academic achievement, parental involvement also impacts other aspects, such as social and emotional factors. As a consequence, they create a wide range of issues and support at the same time [76]. For instance, on the one hand, a parent’s over-expectation could lead to their control over the student’s learning activities and outcomes [77,78]. On the other hand, their step-by-step help also encourages children to accomplish school assignments and improve students’ attendance [79,80].

Last but not least, parental involvement also affects children’s cognitive competences and learning motivation [81–83]. The more that parents valued their children’s learning process and achievement, the stronger motivation and competence their children perceived [84]. Researchers proved that

because of their social prestige, parents might influence the child's behavior and attitude toward homework [85,86]. Researchers also found that even at home or in school, parental involvement was affiliated positively with the student's motivation [87]. In particular, the higher levels of education the parents have, the more stimulating the home environment they provide for their children to promote their cognitive development [88].

2.3. Occupation Aspirations

Occupational aspiration presents students' orientation and yearning toward their target career [89]. Adolescent vocational orientations are affected by many contributory factors, one of which comes from gender roles instead of gender. Dweck and Elliot [89] examined the relationship between occupational orientation and gender throughout two kinds of goal orientations (mastery and performance-approach). They found no association between gender and these kinds of orientation. Nevertheless, there are some studies measuring goal orientations, but the results were around gender-related issues. Anderman and Young [90] realized that boys preferred performance-approach goals more than girls, and girls favored more mastery goals than boys. Consistent with these researchers, Middleton and Midgley [91] fostered gender inclusiveness in each goal orientation by putting it in academic settings, and found that mastery-oriented girls displayed a more efficacious tendency in learning, such as high self-regulation learning and a higher engagement in studying than performance-oriented boys. Although these findings sounded reasonable, Hutchins [92] continued to support Dweck and Elliot [89], stating that the significant relationships between both femininity, masculinity, and performance-approach still exist. Furthermore, both Makarova et al. [93] and Vuong et al. [94] adopted this standpoint. They stated that STEM-related school subjects were believed to follow a male domain due to their preference for STEM-related jobs. Thus, regarding both learning and working purposes, classifying the appropriate behaviors and characteristics of subject or career for each gender is considered apparent, especially for students from collectivist cultures, who are more influenced by their parents.

Another additional factor in children's career aspirations is parents' involvement. Bejanyan et al. [95] stated that parents from collectivist backgrounds rarely forgot to put their passions into their children. That explains adolescents' loss of interest in learning because of parents' pressure to follow their wishes. Nevertheless, many are still satisfied with their parents' arrangement [96]. Garcia et al. [97] found the moderating effect of adolescent–parent relationships over learning outcomes and self-efficacy. Specifically, the higher the self-efficacy, the better the learning outcomes. Moreover, Sawitri and Creed [98] presumed that being compatible with parents' orientation might never be a dead-end road when their parents smooth their career aspirations by the frequent encouragement and unceasing concern. Simultaneously, when both adolescents and parents maintain sustainable compatibility, a crisis of confidence of these adolescents decreases during career-related tasks. However, all of these results have supported some good points from the congruence without validating its direct impact on learning habits at home.

3. Research Approach

3.1. Research Questions

The aspiration of this study was not to construct a new framework to measure students' learning habits, as well as learning effectiveness, which needs longitudinal observations. Regarding the urgent changes in the educational delivery method, this paper aimed to examine the differences in students' studying habits during school suspension time as a result of COVID-19 and its mediating factors. The following research problems were addressed:

1. Are there differences in students' learning habits during sudden school closure among different socioeconomic status?
2. Are there differences in students' learning habits during sudden school closure among different occupational aspirations?

3. How does the student's perception about self-learning and other factors influence students' learning habits during sudden school closure time?

3.2. Sampling Method

As Vietnam's political and cultural center, Hanoi has 1556 schools with more than 1.4 million Pre-K to 12 students, which is 17.5 percent of the city's total population [99]. During the sudden school suspension, it was impossible to provide proper observation and support to this considerable number of students. Thus, this study chose Hanoi as the site to examine the readiness and effectiveness of a typical major city of Vietnam, in which most students from all areas have proper access to the Internet.

We contacted several public and private schools to collect the data, but they were unable to manage the data collection and were unable to provide students' phone numbers. To secure the timely response to the issue, we spread the questionnaires through a network of lower secondary and upper secondary teachers and parents in various educational forums on Facebook. The snowball sampling approach was adopted from 7 February, 2020 to 28 February, 2020: the first two weeks of school closure due to COVID-19 in Vietnam. Parents and teachers were asked to validate their students' ability and willingness to participate in the survey before forwarding the survey to students. Students were required to read and confirm the consent form before moving to the detailed questions. The data collection protocol was observed and approved by the Institutional Review Board of EdLab Asia Educational Research and Development Center, approval No 200214. We tested the results of 50 early respondents by factor loadings before continuing the survey spread, in which a total of 460 responses were received. We excluded participants who had invalid answers (such as their year of birth was after 2009, which meant they were primary students; or learning hours were more than 20 h per day, which seemed to be the learning hours per week, but we had no evidence to convert it into learning hours per day). As a result, we analyzed a dataset of 420 valid observations.

3.3. Research Design

This research article aimed to have an overview of the learning habits of students during school suspension because of the COVID-19 pandemic and find relationships among SES, career orientation, and students' learning habits. In the questionnaire, students were asked questions related to three major categories: (i) students' demographics [50,51,54]; (ii) students' habits of study at home during COVID-19 [34,35]; and (iii) students' self-report on their academic competencies, necessities [71], and effectiveness during the pandemic. In addition, an additional question was added to examine how teachers elevated their lessons beyond regular academic content. Students were asked whether they learned extended knowledge of public health, sustainable environmental development, and sustainable social development during these distance classes or not.

The full dataset of 460 observations was cleaned and resulted in a dataset of 420 valid observations for data analysis. The new dataset was saved in the xlsx format for formal analysis in R and published in Mendeley's data repository for further interpretation [100]. The primary methods used were descriptive statistics, ANOVA analysis, and ordinary least squares (OLS) regression, which are explained in the next part.

The influences of SES and career orientation over learning habits were examined by linear regression—specifically, when we used the learning hours during COVID-19 (*hr_covid*) as the dependent variable. The regression model (1) included gender, grade levels, and the number of siblings as independent variables. The regression model (2) examined the moderating effect of family income and school type, and model (3) highlighted the differences of students with different occupational aspirations, based on university entrance exam subject groups.

$$\text{Hr_covid} \sim \beta_0 + \beta_1 * \text{gender} + \beta_2 * \text{grade} + \beta_3 * \text{sib} + u \quad (1)$$

$$\text{Hr_covid} \sim \beta_0 + \beta_1 * \text{income} + \beta_2 * \text{school_type} + u \quad (2)$$

$$\text{Hr_covid} \sim \beta_0 + \beta_1 * \text{exam} + u \quad (3)$$

4. Results

The students' learning hours during COVID-19 based on demographics are presented in Table 1. On average, the surveyed students spent around 2.8 h (SD = 1.60) studying at home on a typical day, and about 3.7 h (SD = 2.64) studying on days of school closure due to the COVID-19 pandemic. These numbers were at a middle level when compared with the average time spent on homework per day in other Asian countries, such as Japan (2.2 h for junior high and 2.5 h for high school students), Korea (3 h for high schoolers), Taiwan (3.7 h for 11th graders), and India (4–5 h for high school students) [48]. However, in the future, there will likely be a higher number of learning hours, since the collected data was only from the first two weeks of school closure. After that, the Vietnam Ministry of Education and Training published Official dispatch 793/BGDĐT-GDTTrH about enhancing teaching on the Internet and television during the time of preventing and fighting against COVID-19 [101]. As a result, compulsory study time for students, as well as their self-learning hours, increased.

Table 1 illustrates the demographic of respondents associated with learning hours during COVID-19 using a descriptive analysis. As can be seen, more than half of the surveyed students used less than 4 h to study. Regarding school type, 75% of international school students used less than 4 h for learning, 25% of them used more than 7 h to study, while the numbers in private school were 47.9% and 10.6%, respectively. Regarding self-evaluation about learning competency and English competency, it was clear that students who evaluated as "below average" or "average" would spend less time to study (more than 60% of them studied for less than 4 h) than those who thought they were "good" and "excellent."

Table 1. Demographic of respondents associated with learning hours during COVID-19.

	Under 4 h		From 4 to 7 h		Over 7 h	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Gender						
Male	91	54.8%	55	33.1%	20	12.0%
Female	129	54.0%	80	33.5%	30	12.6%
Not public	9	60.0%	5	33.3%	1	6.7%
Grade level						
Secondary school	119	50.9%	88	37.6%	27	11.5%
High school	110	59.1%	52	28.0%	24	12.9%
School type						
(i) Public school (normal)	111	59.7%	57	30.6%	18	9.7%
(ii) Public school (Gifted)	67	50.8%	44	33.3%	21	15.9%
(iii) Private school (normal)	45	47.9%	39	41.5%	10	10.6%
(iv) International school	6	75.0%	0	0.0%	2	25.0%
Father's job						
STEM-related	74	52.5%	51	36.2%	16	11.3%
Social Sciences-related	87	50.6%	60	34.9%	25	14.5%
Free	45	61.6%	19	26.0%	9	12.3%
Others	23	67.6%	10	29.4%	1	2.9%
Mother's job						
STEM-related	17	53.1%	11	34.4%	4	12.5%
Social Sciences-related	140	51.9%	93	34.4%	37	13.7%
Free	42	66.7%	15	23.8%	6	9.5%
Others	30	54.5%	21	38.2%	4	7.3%

Table 1. Cont.

	Under 4 h		From 4 to 7 h		Over 7 h	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
University entrance exam's subject group						
A (Math, Physics, Chemistry)	31	59.6%	17	32.7%	4	7.7%
A1 (Math, Physics, English)	20	31.3%	34	53.1%	10	15.6%
B (Math, Biology, Chemistry)	8	34.8%	14	60.9%	1	4.3%
C (Literature, History, Geography)	16	72.7%	3	13.6%	3	13.6%
D (Literature, Foreign Language, Math)	111	59.4%	50	26.7%	26	13.9%
Other	43	59.7%	22	30.6%	7	9.7%
Family monthly income (USD)						
(i) Under 430	36	58.1%	20	32.3%	6	9.7%
(ii) From 430 to under 860	84	59.6%	47	33.3%	10	7.1%
(iii) From 860 to under 1290	54	55.7%	28	28.9%	15	15.5%
(iv) From 1290 to under 1720	18	36.0%	24	48.0%	8	16.0%
(v) From 1720 to under 2150	15	50.0%	9	30.0%	6	20.0%
(vi) More than 2150	22	55.0%	12	30.0%	6	15.0%
Self-evaluation on learning capability						
Below Average	6	85.7%	1	14.3%	0	0.0%
Average	70	64.2%	33	30.3%	6	5.5%
Good	128	51.0%	91	36.3%	32	12.7%
Excellence	25	47.2%	15	28.3%	13	24.5%
Self-evaluation on English capability						
Below Average	23	65.7%	9	25.7%	3	8.6%
Average	82	60.7%	44	32.6%	9	6.7%
Good	99	51.8%	65	34.0%	27	14.1%
Excellence	25	42.4%	22	37.3%	12	20.3%

Regarding the ANOVA analysis, the test of homogeneity (Appendix A) classified that six variables (gender; grade level; school type; mother's job; university entrance exam's subject group; and monthly income) had significance levels bigger than 0.05. Thus, these variables were eligible for an ANOVA analysis (Appendix B). On the other hand, the other three (father's job; self-evaluation on learning capability; self-evaluation on English capability) were adopted for the Robust Test of Equality of Means (Appendix C). The results reported that there were only four factors associated with the differences in students' learning habits: university entrance exam's subject group; self-evaluation on learning capability; and self-evaluation on English capability.

Figure 1 reported that students who maintained their learning because of their intrinsic motivation to ensure regular academic progress and to sustain their learning habit (they answered "agree" or "strongly agree" for the question) tended to learn for more extended hours (1.68 and 1.86 h on average). Meanwhile, students who studied because they were influenced by other people (extrinsic motivation) tended to learn for fewer hours. Those who were not affected by other people spent more time studying (on average from 1.77 to 1.83 h).

Figure 2 illustrates the factors that affected students' learning effectiveness based on their self-evaluation associated with their learning hours. According to the students' view, the effectiveness of self-learning, when achieved because of adequate support from family, a comfortable learning environment, sufficient learning resources, or communication with friends, would lead to fewer learning hours (on average from 1.88 to 1.98 h). Those were considered extrinsic factors, in contrast to three intrinsic factors: learning motivation, ability to set daily learning objectives, and concentration skill, which were associated with more learning hours (on average from 2.02 to 2.09 h).

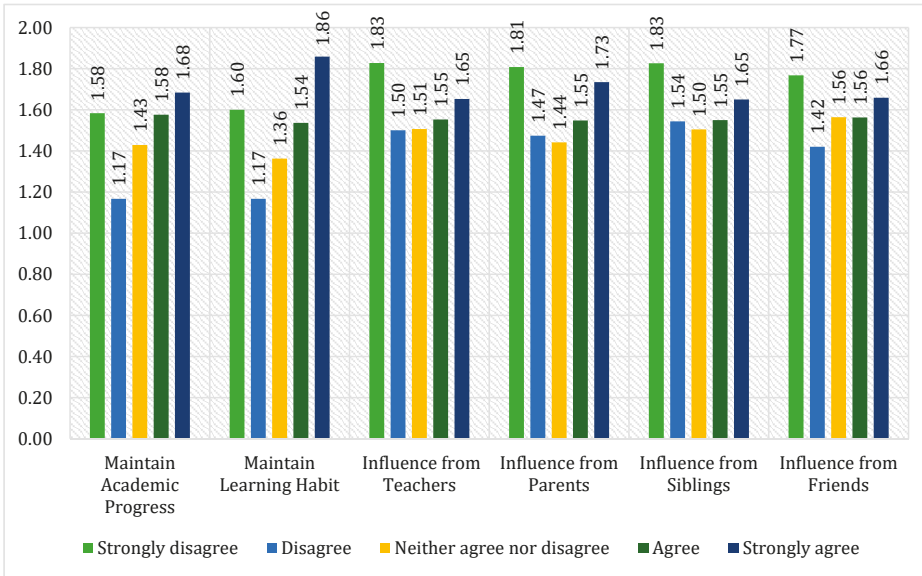


Figure 1. Students’ perception of the necessity of self-learning associated with learning hours during COVID-19.

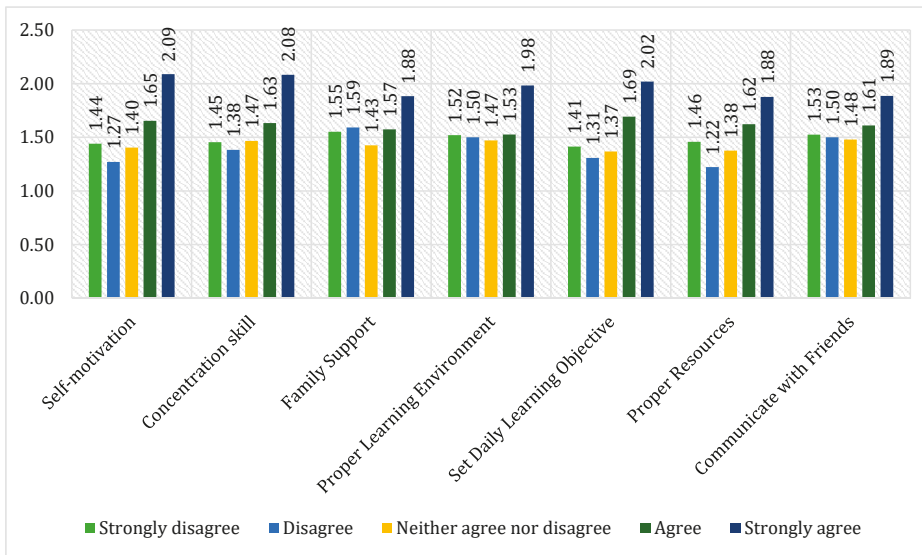


Figure 2. Factors that support students’ effective learning associated with learning hours during COVID-19.

To supplement the results of the ANOVA analysis, Table 2 reports significant differences in students’ learning habits regarding their school types, grade levels, and occupational aspiration. In particular, students from private schools spent more time learning during COVID-19 than students from public schools. Older students tended to spend fewer hours learning online or learning with instruction.

Table 2. Ordinary least squares (OLS) regression of socioeconomic status and career orientation on learning hours.

		Hr_covid	Online	Offline	With Instruction
Socioeconomic status	Gender				
	Grade level		−0.4495 ** R2 = 0.2476		−0.4704 *** R2 = 0.5953
	Siblings				
	Income			−1.5929 * (iii) R2 = 0.2222	
	School type		2.0101 ** (iii) R2 = 0.2385	1.4711 * (iii) R2 = 0.2222	1.8327 *** (iii) R2 = 0.6300
Occupational aspiration	Exam	1.2554 * (A1) R2 = 0.3947	−2.2891 * (D) −2.0715 * (Other) R2 = 0.1856	−1.5765 * (A1) −1.7400 ** (D) R2 = 0.2749	

* Correlation is significant at the 0.05 level; ** correlation is significant at the 0.01 level; *** correlation is significant at the 0.001 level; (iii) school type is private school; (iii) income belongs to group from 860 to under 1290 USD; university entrance exam’s subject groups: A1 (mathematics, physics, English), D (literature, foreign language, mathematics), Other (university entrance exam’s subject group other than A, A1, B, C, D).

Figure 3 visualizes the additional know-how on several sustainable topics, which students were taught in the distance-learning lesson during COVID-19. The topics were related to knowledge about preventive health care, SARS-Cov-2, environmental sustainable development, societal sustainable development, and E-learning tools. It is clear that students learned a lot about preventive health care and SARS-CoV-2, with more than 70% of students responding “agree” and “strongly agree.” The number for sustainable development knowledge was around 50%. Moreover, students did not seem to learn much about e-learning tools. Since these were the first weeks of the school closure, both schools and students had not found or become familiar with many online tools to facilitate their learning.

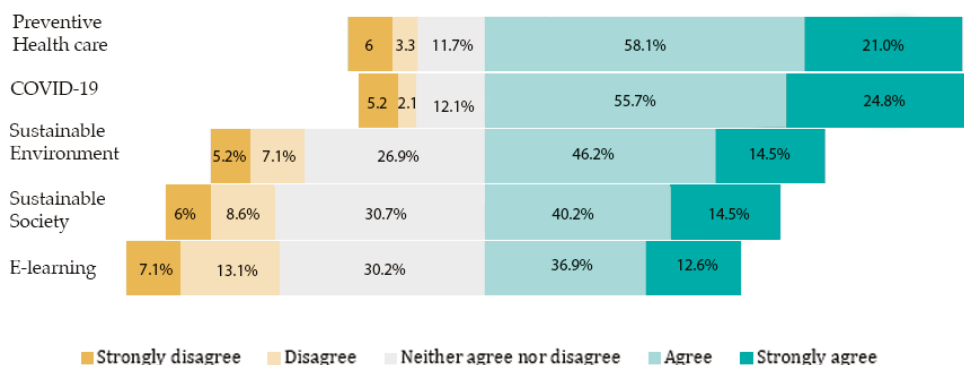


Figure 3. Extended know-how on several sustainability topics during COVID-19’s online classes.

5. Discussion

Sustainable education is not a status quo, but an incremental process, in which the learner’s self-efficacy always plays a crucial role [5]. As novel evidence about Vietnamese K6–12 students’ learning at home habits during school closure due to COVID-19, the findings of this study can help to tackle the potential issues of such sudden situations in the future. Notably, this research found

significant differences in students' learning routines from different school types, grades, and career orientations. Furthermore, there were notable differences in learning habits among students with varying learning capabilities, motivation, and self-regulation.

Regarding the first research question, the regression results stated that students in private schools spent more hours (4.0 h compared to 3.4 h on average) on learning during the pandemic than students in public schools. This result was consistent with that of Ali et al. [68], who concluded that the studying at home hours of students from private schools was higher than that of public school students. Moreover, students who studied in private schools received support from parents more than their peers in public schools [68]. In our study, students in private schools spent more hours on both online learning, offline learning, and learning with instruction than those of students in public schools. This result can be combined with other findings, such as students' study concentration or inclination to study for the exam, to produce conclusions about students' learning habits in private schools and public schools.

Secondly, older students tended to spend fewer hours learning online (on average, 2.5 h compared to 2.9 h of the younger group) or learning with instruction (on average 1.1 h compared to 1.5 h of the younger group). This result was contrary to what was found in the research of Ke and Kwak [49], in which older students spent more time on online learning activities. In our sample, it is understandable that older students did not need as much instruction as younger students. Thus, the learning hours with instruction decreased as age increased. Regarding online learning, Oyemi et al. [9] claimed that students' learning habits are partially distracted by the usage of social networks and entertainment activities at home. Specifically, senior students consume more hours of entertainment on the Internet than students at lower grade levels [60,61]. As a result, it is apprehensible that students in higher grade levels would allocate less time for online learning, given their distractions, even though they might spend more time using the Internet.

A valuable insight is that we found no difference in learning habits between genders, which contrasted with previous empirical studies that found that female students spend more time studying at home than their male friends [40,41]. Students' learning habits are influenced the most by their parents and teachers. However, family income only had partial influence over students' learning habits, and the only meaningful result recorded belonged to the over-average income group (between 860–1920 USD per month). Students from these families spent less time learning offline during sudden school closure than the other groups. An explanation for this is that high-income families would have plenty of home resources, more internet access, a premium subscription to online courses, and more online learning and less offline learning. Some studies suggested similar results, in which home resources, such as abundant learning materials, a convenient learning space, and accessibility of additional opportunities and services, can affect students' academic performance [64,98]. Thus, the moderating effect from parents over students' learning habits might be caused by sociocultural factors rather than socioeconomic factors. Finally, students' siblings had no significant influence on students' learning habits.

Regarding research question two, there were differences in students' learning habits during the sudden school closure among different occupational aspirations, mainly in group A1 (math, physics, chemistry) and group D (literature, foreign language, math). Students who planned to take exams with group A1 tended to study more hours on average (1.2 h) and preferred to study with less instruction from other people. Students who planned to take exams with group D also tended to spend more hours of self-learning but did not prefer online learning, with an average of 2 h less than other groups. Self-efficacy is people's judgment about, and the ability to, control their competencies across various circumstances [102,103]. In academic settings, Bassi et al. [104] found that students who reported higher self-efficacy spent more time solving home assignments. In contrast, students with lower levels of self-efficacy tended to avoid schoolwork and replaced it with leisure activities. In this study, we did not measure students' self-efficacy, yet there were two questions related to one efficacy factor—namely, students' belief in their learning ability regarding a particular subject [103]. We found that students

who reported having high self-learning competency would spend more time (about 30 min more) studying during school closure than those who reported lower self-learning competency.

Regarding the final research question, we found several differences in students' learning habits based on their motivation to learn and their self-regulation. Respecting learners' intrinsic motivation, students who thought that self-learning was necessary because it maintained their learning habits spent about 40 min more studying during school closure. Meanwhile, extrinsic motivation, such as influences from parents, teachers, siblings, or friends, did not have notable effects on students' learning hours. Among these influencers, students who learned because of their siblings' affection spent about 20 min less to study. These findings were partly consistent with what was found by Bergin [46]: that intrinsic motivation is the reason children do homework, not extrinsic motivation. According to Schunk [105], self-regulated learning is the discipline that can be triggered by students' perceptions and behaviors toward learning objectives. In our research, students who explained their self-learning effectiveness by being self-motivated and setting proper learning outcomes for each day often studied 20 to 30 min more.

Besides, students with various learning resources spent more time studying than those with more scattered resources. Some studies suggested similar results, where the availability and diversity of learning material, equipment, and extended educational opportunities could affect students' academic performance [64,98].

Last but not least, the empirical evidence stated that Vietnamese teachers took advantage of the closure by integrating additional know-how into the online lesson properly. The data indicated that 80.5% and 79.1% of students accessed additional knowledge about SARS-CoV-2 and overall preventive healthcare, respectively. About 60.2% and 54.5% of the students reported that their lessons were elevated beyond the regular subject contents by the integration with sustainable environmental development and sustainable social development. This is a positive signal regarding the country's movement from content-based teaching into competency-based teaching.

6. Conclusions

Sustainable education development requires the involvement of various stakeholders toward the structure of the educational system, educational policies, and practices [106]. As an emerging country, Vietnam is dealing with multiple well-known and unknown struggles to pursue sustainable education [59]. Thus, the discoveries of this work have several implications in both the short-term and long-term. First, the study responded to the suggestion of Vuong et al. [5] to examine students' self-efficacy among different social strata. In particular, we investigated the influence of socioeconomic factors over Vietnamese students' learning habits during the fanciful situation of COVID-19. In detail, there were significant differences in students' learning habits among students from different types of schools and grade levels. Regarding the family income, the only difference belonged to students in families with above-average income (from 860 to under 1290 USD). Therefore, future policies and practices on distance learning should pay much attention to the characteristics of various school types and grade levels. Second, the learning habits of students with different levels of self-competencies, English, and career aspirations were clarified. Further investigations should focus on this area to figure out the mechanism behind this phenomena to optimize the learning habits of students with different capabilities. Moreover, students' perception of the necessity of self-learning during the pandemic revealed differences in their learning habits. Also, the supportiveness of factors that accelerated student learning and the teachers' efforts toward a sustainable education development goal was illustrated. Regarding all of these self-efficacy-related learning habits during the digital transformation process, policymakers, educational managers, and education practitioners need to reconsider the importance of the United Nations' Sustainable Development Goal 4: Quality Education.

Furthermore, several limitations can be tackled by future investigations. First, the survey was conducted within the first two weeks of the school closure period, in which the support from the school and social awareness about online learning was not as high as in the coming weeks. Thus,

an additional investigation after the end of COVID-19 is necessary. Secondly, the survey was designed for the unique target of this study, which is timely; thus, the validity of the questionnaires was tested within the first 50 respondents only. Further survey constructs and validation should be considered in the future to examine students' online learning habits. Thirdly, the socio-demographics of this study's population fit with major cities only. When concerning other provinces and cities, in which access to the Internet is limited and the role of private schools is not significant, different perspectives and scales of socioeconomic measurement should be applied. Furthermore, the sample size was not big enough; thus, some subsets of variables were not balanced: for example, there were many respondents from high school but not from middle school, or too many students chose subject group D (literature, foreign language, mathematics) compared to other groups.

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Acknowledgments: The COVID-19 is causing unimaginable impacts on the educational system worldwide. Regarding the situation of Vietnam, a country always considers education as the top national priority. Vietnamese parents are always amenable to spend their savings or even willing to sell their houses to secure their children's learning. Even during the Vietnam war, the educational system has never been suspended as much as this time. Thus, we want to take advantage of this research as an encouragement for all Vietnamese educators, students, and parents, especially the teachers who have not had a salary for the last three/four months, and the school owners who are facing the risk of bankruptcy. We would like to say thanks to all students who participated in this study, as well as teachers and parents, who supported to ensure the ethical considerations and spread over the questionnaires. We also would like to acknowledge all doctors, medical staff, government officers, and volunteers who are fighting with COVID-19. Last but not least, we would like to express our gratitude to the editorial board and all reviewers who dedicated themselves to making the results of this work appear novel.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Gender	0.398	2	417	0.672
Grade level	0.382	1	418	0.537
School type	1.717	3	416	0.163
Father's job	2.855	3	416	0.037
Mother's job	1.338	3	416	0.261
University entrance exam's subject group	2.004	5	414	0.077
Family monthly income (USD)	1.982	5	414	0.080
Self-evaluation on learning capability	8.842	3	416	0.000
Self-evaluation on English capability	2.863	3	416	0.037

Appendix B ANOVA Results

ANOVA		Sum of Squares	df	Mean Square	F	Sig.
Gender	Between Groups	0.204	2	0.102	0.209	0.812
	Within Groups	204.357	417	0.490	-	-
	Total	204.562	419	-	-	-
Grade level	Between Groups	0.496	1	0.496	1.017	0.314
	Within Groups	204.066	418	0.488	-	-
	Total	204.562	419	-	-	-
School type	Between Groups	2.124	3	0.708	1.455	0.226
	Within Groups	202.438	416	0.487	-	-
	Total	204.562	419	-	-	-
Mother's job	Between Groups	1.998	3	0.666	1.368	0.252
	Within Groups	202.564	416	0.487	-	-
	Total	204.562	419	-	-	-
University entrance exam's subject group	Between Groups	6.592	5	1.318	2.757	0.018 **
	Within Groups	197.970	414	0.478	-	-
	Total	204.562	419	-	-	-
Family monthly income (USD)	Between Groups	4.695	5	0.939	1.945	0.086
	Within Groups	199.867	414	0.483	-	-
	Total	204.562	419	-	-	-

* Correlation is significant at the 0.05 level; ** correlation is significant at the 0.01 level; *** correlation is significant at the 0.001 level.

Appendix C Robust Tests of Equality of Means

Welch	Statistic	df1	df2	Sig.
Father's job	2.523	3	131.111	0.061
Self-evaluation on learning capability	6.377	3	29.235	0.002 **
Self-evaluation on English capability	3.714	3	117.499	0.014 **

* Correlation is significant at the 0.05 level; ** correlation is significant at the 0.01 level; *** correlation is significant at the 0.001 level.

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Article

A Human Rights-Based Approach in Implementing Sustainable Development Goal 4 (Quality Education) for Ethnic Minorities in Vietnam

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Abstract: Seventeen sustainable development goals (SDG) by the United Nations in its 2030 Agenda have been nationalized and implemented in Vietnam. One of the country's priorities is making educational provision accessible to all of its residents, especially for marginalized groups, while enforcing their human rights. In this context, this article examines the implementation of SDG4 (quality education) in combination with the practice of human rights for ethnic minorities in Vietnam. With access to jurisprudence, this research provides a detailed assessment of the compatibility between SDG targets and the legal rights to education of ethnic minorities. Additionally, this research employs an exploratory method to investigate the four major conditions for the implementation of quality education for ethnic minorities, namely legal-political, economic, socio-cultural factors, and participation pride. We also investigate three main barriers that hinder SDG4 implementation and human rights practices, namely child labor, language, and gender inequality. The contribution of this study is necessary for establishing more informed strategies and policies towards sustainable development in education for multi-ethnic countries.

Keywords: educational rights; ethnic minorities; quality education; sustainable development goals; multi-cultural education

1. Introduction

Vietnam is a multi-ethnic nation with 54 ethnic groups, of which the Kinh is considered the majority [1]. The remaining 53 ethnic communities, comprising about 14.6% of the national population (13.39 million people), are considered ethnic minorities. Ethnic minorities in Vietnam often reside in harsh weather and geographical conditions and have difficult socio-economic conditions, which affects, to a certain extent, the opportunities and the implementation of human rights for them. To improve human rights practices in the country, Vietnam's Central Party Committee issued Directive No. 12-CT/TW dated 12 July 1992 to highlight the national recognition of basic human rights for Vietnamese ethnic minority groups.

Vietnam has taken the 17 sustainable development goals (SDGs) established by the United Nations for global sustainable development in the 2030 Agenda as a benchmark for the long-term development of the country. These global SDGs have been adapted into 115 Vietnam SDGs (VSDGs) to suit the nation's conditions and contexts and are included in Vietnam's National Action Plan for the implementation of the 2020 Agenda [2]. The areas of priority in Vietnam for sustainable development are education, vulnerable groups, and social equality, to ensure that no one is left behind. Some of

the remarkable achievements so far can be seen in the reduction in inequality and the improvements made in supporting access to justice [2]. These initial successes in developing education and social justice make the country confident in the continuing prioritization of SDG4 (quality education) as a firm basis for economic, social, and cultural development [2]. In particular, as a multi-ethnic country, Vietnam is determined to develop the education of all ethnic groups without discrimination in its efforts to achieve the SDGs comprehensively.

Implementing quality education in SDG4 in ethnic minority areas in Vietnam under a human rights-based approach is a rather newly explored content. Therefore, this research is conducted by employing the jurisprudence method to explore the compatibility of SDG targets with elements of human rights in education for ethnic minorities. An exploratory aspect is added with a questionnaire to 300 respondents from Tan Trao University, Tuyen Quang Province, to investigate the legal–political, economic, socio-cultural and participation pride conditions in the implementation of human rights to ensure quality education among ethnic minority groups. With this method, barriers to implementation, including child labor, gender inequality, language and others, are also examined. Finally, further implications for both academic research and managerial practices are drawn to contribute to the improvement of SDG4 for Vietnamese ethnic minorities.

2. Literature Review

2.1. An Overview of Goals and Targets for Global Sustainable Development

In the context of growing globalization, the United Nations (UN) set up 17 global goals for sustainable development by 2030 in its 2030 Agenda. The goals address comprehensive conditions required for sustainable development, including education, poverty, climate change, equality, economic growth and so forth (Table 1).

Table 1. Sustainable Development Goals in 2030 Agenda [3].

UN_SDGs	Definitions	Descriptions
UN_SDG 1	No poverty	Ending poverty in all its forms everywhere
UN_SDG 2	Zero hunger	Ending hunger, achieve food security, and improved nutrition and promote sustainable agriculture
UN_SDG 3	Good health and well-being	Ensuring healthy lives, and promote well-being for all at all ages
UN_SDG4	Quality education	Ensuring inclusive and equitable quality education and promote lifelong learning opportunities for all
UN_SDG 5	Gender equality	Achieving gender equality and empower all women and girls
UN_SDG 6	Clean water and sanitation	Ensuring availability and sustainable management of water and sanitation for all
UN_SDG 7	Affordable and clean energy	Ensuring access to affordable, reliable, sustainable and modern energy for all
UN_SDG 8	Decent work and economic growth	Promoting sustained, inclusive and sustainable economic growth, full and productive employment, and decent work for all
UN_SDG 9	Industry, innovation, and infrastructure	Building resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
UN_SDG 10	Reduced inequalities	Reduce inequality within and among countries.
UN_SDG 11	Sustainable cities and communities	Make cities and human settlements inclusive, safe, resilient, and sustainable.
UN_SDG 12	Responsible consumption and production	Ensure sustainable consumption and production patterns.
UN_SDG 13	Climate action	Take urgent action to combat climate change and its impacts
UN_SDG 14	Life below water	Conserve and sustainably use the oceans, seas, and marine resources for sustainable development.
UN_SDG 15	Life on land	Protect, restore, and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.
UN_SDG 16	Peace, justice, and strong institutions	Promote peaceful and inclusive societies for sustainable development; provide access to justice for all and build effective, accountable, and inclusive institutions at all levels.
UN_SDG 17	Partnership for the goals	Strengthen the means of implementation and revitalize the global partnership for sustainable development

As shown in Table 1, SDG4 is defined as concerning quality education by “ensuring inclusive and equitable quality education and promoting lifelong learning opportunity for all” [4]. Seven targets are entailed to specify SDG4, including:

- (4.1) free, equitable and quality primary and secondary education for all;
- (4.2) quality early childhood development and pre-primary education for all;
- (4.3) access to quality technical, vocational and tertiary education for all;
- (4.4) developing relevant skills for employment for all;
- (4.5) the elimination of gender disparities in education and equal access to all levels of education training for the vulnerable, including indigenous people;
- (4.6) literacy and numeracy for all;
- (4.7) acquiring the necessary knowledge and skills for sustainable development and lifestyles, human rights, gender equality, promotion of peace and non-violence, global citizenship and appreciation of cultural diversity.

The focus of all SDG4 targets is quality education for all school levels, from primary to tertiary education and for all age groups from children to adults, irrespective of their ethnic background. Among those, Target 4.7 is considered the most crucial one in terms of its involvement in other SDGs. The target is also important to facilitate the measurement of the remaining targets, such as gender equality in Target 4.5 and necessary knowledge and skills in Targets 4.1, 4.2, 4.3 and 4.6. In a related note, Target 4.5 refers to indigenous people as one of the vulnerable groups that need to have gender inequality in education removed.

Multi-ethnic countries in the world, especially the Association of Southeast Asian Nations ASEAN, have followed distinctive approaches to implement their own SDGs. In Southeast Asia, the inevitable discrepancy in the level of economic development among ethnic minorities also leads to completely different concerns for their sustainable development. On top of that, SDG4 receives further in-depth analyses that are concretized in three middle-income countries, Indonesia, Malaysia and Vietnam [5]. A rights-based approach is mentioned as the building block for accomplishing equity, recognizing and eliminating barriers, and encouraging and supporting diversity [6].

2.2. Sustainable Development Goal 4 (SDG4) for Ethnic Minorities

To approach measures for vulnerable groups, the UN adopts “substantive equality” [7–11]. By targeting substantive equality, the UN resolves long-existing conflicts in equality law, while still focusing on human rights for underrepresented groups. In this way, concretized and appropriate measures can be established to develop the capacities of these vulnerable groups and promote opportunities for them to approach and enjoy their human rights.

Research on SDG4 for ethnic minorities can be divided into two periods. Before 2015, the focus of most research was placed on implementing Millennium Development Goals (MDGs) [12,13]. Nonetheless, this shifted to proposing to develop SDGs after the MDGs were found to be at fault. Refs. [14,15] signify fundamental points in SDG4 in the general context of ethnic communities. SDG4 targets educational purposes, underscoring the need to protect the principles of human rights for ethnic minorities who are still suffering from hardships [14].

After 2015, studies have mostly aimed at figuring out the most feasible ways to promote SDG4. Ref. [16] emphasizes the need to provide education for less advantaged children from all walks of life.

The children most likely to stay out of school are children from the poorest households; ethnic and linguistic minorities; working children; those in nomadic or sparsely populated areas; orphans and children affected by HIV and AIDS; slum dwellers; children with disabilities; and children living in complex emergencies. (p.9)

Ref. [16] adds that technology alone is not enough for educational transformation. In contrast, Ref. [17] recommends “augmented reality binomial-mobile” devices and the use of lip integration technology as a breakthrough teaching methodology.

2.3. Human Rights of Ethnic Minorities Reflected in SDG4

Since SDGs were published and enforced, the compatibility of SDG4 with human rights has been of wide interest as it deals with the most inspiring and contentious concern, the human right to education. The targets of SDG4 have been framed using two methods, the Human Rights-Based Approach and People-Centered Advocacy. The former is defined as “both a normative and conceptual framework, based on international human rights standards and ensuring the protection and promotion of human rights for all” [18]. The core of the human rights-based approach is to ensure no discrimination in tackling the causes of poverty, particularly injustice and inequality. The latter is an approach to human rights that emphasizes the elimination of subjective factors when conducting studies in academia and government [18]. This approach requires the transformation in people’s awareness that people are not passive beneficiaries or seekers of charity from the government. Instead, it is the government’s political and moral responsibility to guarantee all human rights to all citizens. Therefore, people have a right to demand that the state ensure impartial social change and distributive justice [18].

As previously mentioned, Targets 4.5 and 4.7 contain the most relevant content for human rights and indigenous groups. A system of five global and thematic indicators for each is sketched out by [19] to gain a closer look at the relations (Table 2).

Table 2. Indicators for Targets 4.5 and 4.7.

Global Indicators	Content
4.7.1	Extent to which (i) global citizenship education and (ii) education for sustainable development, including gender equality and human rights, are mainstreamed at all levels in: (a) national education policies, (b) curricula, (c) teacher education and (d) student assessment
4.5.1	Parity indices (female/male, rural/urban, bottom/top wealth quintile and others such as disability status, indigenous peoples and conflict-affected) for all education indicators on this list that can be disaggregated
Thematic Indicators	Content
4.7.2	Percentage of schools that provide life skills-based HIV and sexuality education
4.7.3	Extent to which the framework on the World Programme on Human Rights Education is implemented nationally (as per the UNGA Resolution 59/113)
4.7.4	Percentage of students by age group (or education level) showing adequate understanding of issues relating to global citizenship and sustainability
4.7.5	Percentage of 15-year-old students showing proficiency in knowledge of environmental science and geoscience
4.5.2	Percentage of students in primary education whose first or home language is the language of instruction
4.5.3	Extent to which explicit formula-based policies reallocate education resources to disadvantaged populations
4.5.4	Education expenditure per student by level of education and source of funding
4.5.5	Percentage of total aid to education allocated to least developed countries

The global indicator (GI) is drawn based on the implementation of the 1974 UNESCO Recommendation concerning Education for International Understanding, Co-operation and Peace Education relating to Human Rights and Fundamental Freedoms. It measures the extent to which countries offer Global Citizenship Education (GCED), including gender equality and human rights education, and Education for Sustainable Development (ESD) in their education systems. For this purpose, four aspects of education systems are examined, including educational policies, curricula, teacher training and student assessment [20]. GI 4.7.1 takes another responsibility for developing and maintaining the thematic indicators (TI) that serve as the follow-up and review tools of SDG4.

GCED and ESD are considered the two indispensable factors for achieving SDG4 as they guarantee quality education and other targets involved in SDG4. Globally, an increasing number of countries are applying GI as a reflection of their human rights and fundamental freedom principles in in-service teacher education. In recognition of this growing trend, the Inter-Agency and Expert Group on SDG Indicators has recently upgraded their tier classification for GI 4.7.1 from tier III to tier II. In other words, GI 4.7.1 is “conceptually clear, has an intentionally established methodology and standards are available, but data are not regularly produced by countries”. At the same time, Target 4.5 receives far wider recognition, as its GI is positioned at tier I and II [20].

In Vietnam, human rights for ethnic minorities have received much consideration in a variety of research fields, especially in education [21,22]. Ongoing practical efforts have also been made to build a national policy and legal system for underrepresented groups in accordance with international laws, especially in preserving minority languages and culture in education rights [9,10]. Moreover, the Central Party and the Government of Vietnam demonstrate the basic need to incorporate the human rights of ethnic minorities in the Constitution of Vietnam as an indispensable move in maintaining a peaceful, prosperous and happy life for all ethnic communities. Among the essential issues to tackle, education, considered in close relation with human rights, will contribute to a comprehensive analysis of the SDGs from a legal perspective [23].

2.4. Quality Education in the Multicultural Context of Education

2.4.1. Quality Education

Quality education, the focus of SDG4, is the core of Education for Sustainable Development. Ref. [24] categorize quality education in the top priority group for achieving sustainability. In agreement, Ref. [25] emphasizes the utmost importance of quality education to the holistic and sustainable development of schooling. Quality education is recognized by four main features, namely the availability of educational infrastructure, accessibility by all with no discrimination, acceptability of methods and adaptability to learners and society [24]. In quality education, not only knowledge, but also skills and attitudes, are prioritized to build up the four pillars of learning. These four major pillars include learning to know, to be, to do, and to live together [26]. Once these objectives are achieved, learners will not only have their learning performance strengthened but have enough capacity to tackle the problems of sustainable development in the future. The contribution of quality education to human and social development will, therefore, be uncountable. For ethnic minority students, the access and maintenance of quality education will significantly facilitate the development of the existing misalignment of educational outcomes. However, one of the major obstacles to achieving quality education is social and economic inequality. In addition, those left behind are the most underrepresented, including ethnic minorities [16].

To achieve the objectives of quality education, a number of studies have agreed upon the four indispensable factors to be involved, namely a well-developed curriculum, in-service teacher training, a safe and effective learning environment, and transformative and cooperative approaches to teaching and learning. For ethnic minorities, [27] highlights the inclusion of indigenous, current, environmental, social and economic issues in mainstreaming quality education. Equality for all without any discrimination is a must and should be the first goal that is realized.

2.4.2. Multicultural Education

Multicultural education has been defined by several researchers in different ways [28]. Each definition carries its own distinguished content and explanation, which is why there is no agreed definition in this regard. In the context of the education of ethnic minorities in this research, multicultural education is defined in accordance with [29].

Multicultural education is an idea, an educational reform movement, and a process. As an idea, multicultural education seeks to create equal educational opportunities for all students,

including those from different racial, ethnic, and social-class groups. Multicultural education tries to create equal educational opportunities for all students by changing the total school environment so that it will reflect the diverse cultures and groups within a society and within the nation's classrooms.

Ref. [30] also puts forward five dimensions of multicultural education. They are content integration, the knowledge construction process, prejudice reduction, an equity pedagogy, and empowering school culture and social structures.

Content integration is the extent to which teachers use examples and content from a variety of cultures and groups to demonstrate their lessons. Prejudice reduction describes lessons and activities used by teachers to help students to develop positive attitudes toward different racial, ethnic, and cultural groups. An equity pedagogy exists when teachers modify their teaching in ways that will facilitate the equal academic achievement of students without discrimination. An empowering school culture and social structure are created when the culture and organization of the school are transformed in ways that enable students from diverse racial, ethnic, and gender groups to experience equality and equal status [29–31].

In this research, multicultural education occurs when, in most primary and secondary classes for ethnic minorities, teachers are mostly Kinh and students are of another ethnic group. On the other hand, in tertiary education, ethnic diversity is greater when students from a variety of ethnic groups share the same class. This context makes it difficult to achieve quality education, as it requires adjustments in general policies and specific pedagogical methods.

3. Methods

3.1. Research Methods

This study employed the jurisprudence method to explore the relationship between legal theories and practices found in Decision No.622/QĐ-TTg for the implementation of SDG4 [32]. Once enough documents were synthesized, the perspectives of human rights and the targets of the SDG4 among ethnic minorities were analyzed to gain an insight into the compatibility between them.

An exploratory approach was also utilized, the first step of which involved reviewing the existing literature to compare and contrast the findings, which were used as bases for examining the conditions and barriers in the implementation of SDG4. A survey was also conducted using questionnaires for 160 students together with 140 officials and lecturers at Tan Trao University in Tuyen Quang Province. This questionnaire was newly developed based on the survey tool by [8], previously administered to 960 respondents from eight ethnic groups, namely Cao Lan, Dao, Hoa, Mong, Muong, Nung, San Diu and Tay in Tuyen Quang, Cao Bang and Dien Bien Provinces.

3.2. Research Instrument

By reviewing the relevant literature, analyzing related laws and using expert opinions in focus group discussions, four main aspects of equal right to schooling synthesized by [7] were utilized in a search for compatibility with seven targets of SDG4 specific to vulnerable groups. Research by in Tuyen Quang Province on 960 subjects was then investigated in full to obtain data for an analysis of the economic, social, cultural, political and legal conditions for SDG4 realization (Table 3).

Finally, a questionnaire was developed based on the one previously designed by [8]. The questionnaire served to seek the opinions of 300 students, lecturers and officials on the conditions and barriers for guaranteeing equality and human rights in education among ethnic communities on the way to achieving SDG4. Equality and human rights in education involve accessibility, availability, acceptability and adaptability to all educational aspects mentioned in targets of SDG4. The respondents responded to forty statements, which were scored on a five-point Likert scale. A score of one represented either the least agreement or the worst condition, whereas a score of five represented either the most agreement or the best condition. Ten additional open questions were included to seek explanations

and recommendations. Fifty questions were distributed and targeted to different groups of subjects, as detailed in Table 4.

Table 3. Variables for research.

Aspects of equal right to schooling (A)	A1. Accessibility to location and cost A2. Availability of educational programs and infrastructure A3. Acceptability of form and content of education A4. Adaptability of flexible education and vocational training
SDG4's targets for vulnerable groups (SDG4)	SDG4.1. Complete free, fair and quality primary and secondary education SDG4.2. Quality development, early childhood care education for children SDG4.3. Equal access to quality and affordable vocational and higher education SDG4.4. Significant increase in skilled workers via vocational training SDG4.5. Equal access to education and training, vocational training for vulnerable people SDG4.6. Literacy and numeracy to all young people and adults SDG4.7. Knowledge and skills necessary to promote the sustainable development
Conditions (C)	C1. Political–legal C2. Economic C3. Socio-cultural C4. Participation motivation
Barriers (B)	B1. Language B2. Child labor B3. Gender inequality B4. Others

Table 4. Questionnaire structure.

Content	Number of Questions (%)	Target Respondents
Conditions – 14 (28%)		
Political	4	Lecturers and Officers
Economic	4	All
Socio-cultural	4	Lecturers and Students
Participation motivation	2	Students
Barriers – 12 (24%)		
Language	3	Students
Gender inequality	3	Students and Lecturers
Child labor	3	Students
Others	3	All
Expectations and reality – 8 (16%)		
Equal rights for schooling	2	All
SDG targets	2	Lecturers and Officers
Conditions	2	All
Barriers	2	All
Relation to GI – 4 (8%)		
SDG4.5.1	3	All
SDG4.7.1	3	All
Recommendations – 10 (20%)		

3.3. Sampling Methods

Tuyen Quang is a province located in the Northern mountainous area of Vietnam. It has 27 ethnic groups, accounting for 52% of the population of the whole province [8]. Tan Trao University, previously an education college established in 1959, is the only tertiary educational institution in Tuyen Quang,

with seven faculties (mostly in liberal arts), eight departments, four centers, one high school, and one clinic. The total annual enrollments are around 13,000. Tuyen Quang is the province whose poverty rate remains high in comparison to other provinces in Vietnam. This entails many difficulties in increasing the number of students pursuing tertiary education as well as improving the education quality of educational institutions within the province. Tan Trao University, despite having the highest-quality staff in Tuyen Quang, still comes across difficulties in consistently maintaining the quality of education for students.

The sample study received responses from a total of 300 respondents of different ethnic backgrounds (Kinh, Dao, Tay, Mong, Muong, Nung) from Tan Trao University. The respondents were divided into three groups based on their roles, namely students, lecturers and officers (Table 5).

Table 5. Sampling.

Groups	Total (%)	Kinh	Dao	Tay	Mong	Muong	Nung
Students	160 (53.3%)	100 (33.3%)	25(8.33%)	15 (5%)	10 (3.3%)	5 (1.67%)	5 (1.67%)
Lecturers	70 (23.3%)	65 (21.7%)	2 (0.67%)	2 (0.67%)	1 (0.33%)	1 (0.33%)	0 (0%)
Officers	70 (23.3%)	60 (20%)	2 (0.67%)	2 (0.67%)	2 (0.67%)	2 (0.67%)	2 (0.67%)
Total	300 (100%)	225 (75%)	29(9.67%)	19 (6.33%)	13 (4.33%)	8 (2.67%)	7 (2.33%)

3.4. Data Analysis

Responses from the survey were coded and entered in SPSS Version 20 and checked for reliability using the Cronbach's alpha (α) reliability estimate ($\alpha = N\rho/[1 + \rho(N - 1)]$). A high reliability coefficient was achieved, with Cronbach's α estimates ranging from 0.710 to 0.903 (≥ 0.6) (Table 6). The corrected item-total correlation estimates ranged between 0.5 and 0.7 (>0.3), also showing good correlations between the variables.

Table 6. Reliability estimates.

Factors	Observed Variables	Cronbach's α	Corrected Item-Total Correlation
A	A1, A2, A3, A4	0.710	>0.3 (0.570)
SDG4	SDG4.1,SDG4.2,SDG4.3,SDG4.4, SDG4.5,SDG4.6,SDG4.7	0.903	>0.3 (0.642–0.763)
C	C1, C2, C3, C4	0.825	>0.3 (0.586)
B	B1, B2, B3, B4	0.690	>0.3 (0.532)

Following this, an Exploratory Factor Analysis (EFA) was conducted to determine the correlation between sub-targets and to determine their corresponding legal elements. The Kaiser–Meyer–Olkin (KMO) test (=0.786) and Barlett's test (=0.000) (Table 7) showed good correlations between the observed variables.

Table 7. Kaiser–Meyer–Olkin (KMO) and Barlett's Test.

Kaiser–Meyer–Olkin measure of sampling adequacy.		0.786
Approx. Chi-Square		3427.532
Bartlett's Test of Sphericity	Df	168
	Sig.	0.000

The loading factors (≥ 0.509) as seen from the Rotated Component Matrix (Table 8) also showed good correlations between the variables.

Table 8. Rotated Component Matrix.

	Components			
	1	2	3	4
A1	0.759			
A2	0.787			
A3	0.802			
A4	0.816			
SDG4.1		0.823		
SDG4.2		0.701		
SDG4.3		0.792		
SDG4.4		0.799		
SDG4.5		0.657		
SDG4.6		0.728		
SDG4.7		0.808		
C1			0.778	
C2			0.706	
C3			0.698	
C4			0.823	
B1				0.715
B2				0.638
B3				0.822
B4				0.701

4. Findings

4.1. Compatibility between SDG4 and the Human Rights of Ethnic Minorities

In a review of literature and experts' findings, the study attains that there is a close relationship between quality education and the rights-based approach in achieving sustainable development (Table 9). The [32] points out that equal life-long learning and quality education can only be guaranteed when rights to education, equality and employment are enforced for all, without discrimination.

Table 9. Sustainable development goal 4 (SDG4) related to human rights.

SDG4	Related Human Rights
4. Quality education: Ensure inclusive and equitable quality education and promote life-long learning opportunities for all.	<ul style="list-style-type: none"> • Right to education including underrepresented groups [33] • Right to equality for minorities [34] and for genders in education [35] • Right to work, including technical and vocational training particularly for less advantaged groups [33,34]

A review of seven outcome sub-targets for SDG4 in The United Nations Declaration of Human Rights in 1948 [36] and four elements constituting educational rights in Vietnam illustrates high compatibility. Each sub-target is compatible with a certain aspect of educational rights. Specifically, availability is compatible with SDG4.1 and SDG4.6, accessibility with SDG4.1, SDG4.3, SDG4.5 and SDG4.7, acceptability with SDG4.2 and SDG4.7 and adaptability to SDG4.4 and SDG4.5 (Table 10).

Table 10. Compatibility between SDG4 and elements of educational rights for ethnic minorities in Vietnam.

SDG4	Elements of Education Rights for Ethnic Minorities
SDG4.1	Availability; Accessibility
SDG4.2	Acceptability
SDG4.3	Accessibility
SDG4.4	Adaptability
SDG4.5	Accessibility; Adaptability
SDG4.6	Availability; Acceptability
SDG4.7	Accessibility; Availability

4.2. Promotion Conditions and Barriers to Implementing Sustainable Development Goal 4 in Vietnam under the Approach of Human Rights in Ethnic Minority Areas

4.2.1. Political–Legal Conditions

The survey used the set of political–legal conditions initiated by [8], which involves legislation (L), policy (P) and strategy system (SS), convention participation (CP) and governmental authority assignment (GAA) (Table 11). When asked to articulate the extent to which they agreed that the State has provided adequate political–legal conditions to improve education for ethnic minorities, 140 lecturers and faculty officers showed a high level of agreement. The mean values for the five elements ranged from 2.46 to 4.49, confirming that all the conditions were perceived by the respondents to be important or very important to the implementation of SDG4 among ethnic groups. The two most essential elements required, i.e., legislation and governmental authority, are spread out across the seven sub-targets, as shown in Table 11.

Table 11. Political–legal conditions for each sub-target.

Sub-Target for SDG4	Political–Legal Conditions
SDG4.1	L, P, CP, GAA
SDG4.2	P, SS, GAA
SDG4.3	CP, L, GAA
SDG4.4	L, SS, CP, GAA
SDG4.5	L, P, SS, CP, GAA
SDG4.6	L, P, GAA
SDG4.7	L, SS, CP, GAA

4.2.2. Economic Conditions for Education

Three hundred respondents were asked about the extent to which their college and classrooms serve their work and study. The mean value range was 2.3–4.52, indicating that economic conditions generally underwent satisfactory to good preparation. Responses also reveal noticeable improvements in economic subsidization by the Vietnamese government for ethnic minorities in their access to tertiary education. Specifically, 100% of ethnic minority students received a monthly stipend, which was adequate to cover their college-life expenses. Moreover, ethnic students were provided with free accommodation in the dormitory system of the college. Their transportation to school was also assisted with a bus system, taking them from their dormitory to the college campus and vice versa. More importantly, all ethnic students enjoyed free-of-charge education in all departments of Tan Trao University. Such economic support was widely recognized among ethnic minorities and was considered to be efficient in relieving the economic burden of many ethnic families, and thus highly encouraging to ethnic minority youngsters, giving them access to quality tertiary education.

4.2.3. Socio-Cultural Conditions and Participation Motivation of Ethnic Minorities

One of the questions to 160 students and 70 teachers was “to what extent are you aware of the education environment that you are in having more than one ethnic?” The responses revealed a mean ranging from 2.1 to 3.5, showing a satisfactory to high level of awareness of multicultural education. When asked about the extent to which such an environment helped them become more aware of who they were in the classroom, the respondents showed a satisfactory level of self-awareness of their identity when the mean ranged between 2.3 and 2.5. The student respondents showed very high agreement in their pride in attending school, with means ranging from 3.07 to 4.59.

4.2.4. Barriers to Implementing Sustainable Development Goal 4 in Vietnam

A total of 300 respondents to the survey questions were asked to rate the extent to which they agreed that ethnic minorities in Vietnam were facing barriers in their access to the educational system. Three major obstacles, including language, gender inequality and child labor, were examined in relation to other obstacles, as seen in the question “to what extent do you agree that children in ethnic families have to work to earn meals or money?” The data collected reveal a high level of agreement among the 300 respondents. The mean values for the four obstacles ranged from 3.78 to 4.09, confirming that all the obstacles were faced by the respondents. The hindrance found to be the biggest to overcome was child labor, whereas the most improvement was found to be in terms of gender inequality (Table 12).

Table 12. Barriers for SDG4 implementation.

Barriers	Percentage
Language	60%
Gender inequality	20%
Child labor	65%
Others	37%

4.2.5. Assistance That Each Target, Condition and Barrier Removal Provides to the Access of Ethnic Minorities to Human Rights in Education

The mean differences between targets, conditions and barrier removal variables reveal the differences between their expected assistance and the reality in relation to the implementation of SDG4, while guaranteeing access to and enjoyment of education for all ethnic minorities “without anyone left behind” (Figure 1). The most remarkable differences belong to SDG4.7, C3 and C2.

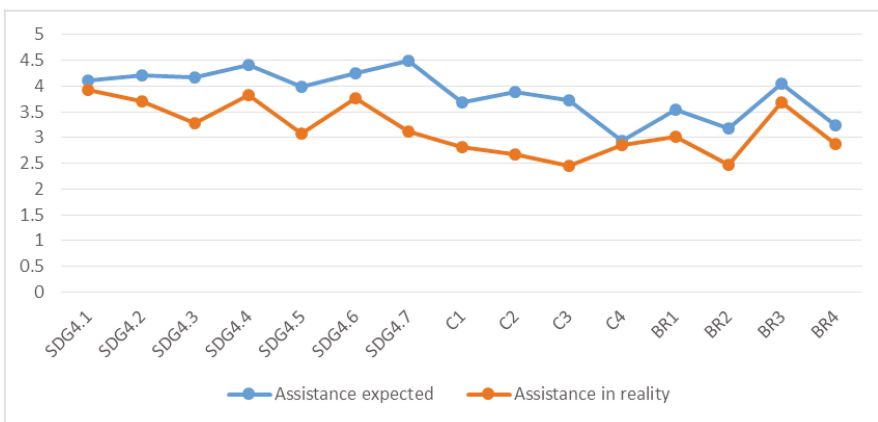


Figure 1. Assistance in theory and in reality in the implementation of SDG4 for ethnic minority groups.

Regarding the compatibility of SDG targets with the lowest mean differences of all contents, it was disclosed that the highest compatibility was achieved in the high expectation for the aid given to ethnic minorities, as well as providing the best assistance for SDG4 implementation among ethnic minorities when brought into practice. On the other hand, the highest mean difference between the seven targets belonged to SDG4.7. This means SDG4.7 was perceived as the most important factor in carrying out SDG4.

Of all the conditions surveyed for SDG4 implementation, C1 and C4 received the lowest mean difference—that is, the legal–political condition and participation motivation were the two preparations that were in closest relation to their theoretical expectation. Participation motivation among ethnic minorities was high in both theory and reality. Ethnic minority people took great pride in being involved in the national development route. Nevertheless, the mean differences between C2 and C3 were the largest out of all fifteen elements. This means that, despite the importance that the economy and socio-cultural factors held in the implementation, the real conditions did not meet the expectations.

Concerning barrier removal, the most marked difference occurred for child labor, followed by language. This means that solutions to removing the barriers of child labor and language differences to make access to quality education available to all ethnic minorities were not as efficient as expected (Figure 1).

5. Discussion

The study finds that all the targets of SDG4 in combination can meet the requirements of human rights to education for ethnic minorities. In particular, the implementation of the two most-related ones, Targets 4.5 and 4.7, can guarantee all four As, namely availability, accessibility, acceptability, and adaptability. This finding confirms the righteousness of the Vietnamese government in localizing SDG4 to better manage the education progress, particularly for ethnic minority communities [7,10,37–39]. More importantly, the detailed compatibility helps the government to enact more effective laws and policies that prioritize Targets 4.5 and 4.7 in the context of a multi-ethnic country. The finding also resonates with [9,40] in that the authority’s governance plays a fundamental role in enforcing and applying the laws, policies and strategies to achieve SDG4 among ethnic minorities. This outcome also reveals the faith ethnic minority people have in their government in the effort to achieve sustainable development with their powerful legal and managerial tools [41]. Particularly, in an educational regard, the finding agrees with [8] about the importance of mainstreaming national education policies that involve gender equality and human rights. The legal framework in the process of both boosting its effectiveness and ensuring the basic human rights of ethnic minorities during law enforcement, especially for disadvantaged groups [9,40,42]. The national strategies that the Vietnamese government has set up are believed to far surpass the standards set by the global SDG4 version and to meet all aspects required for the rights of ethnic minorities in Vietnam, while adapting global goals to local needs [43]. The political system also makes a proper appeal to the authorizing bodies to take charge of the implementation, including mainly the Ministry of Education and Training and Ministry of Labor, Invalids and Social Affairs, in coordination with other related ministries and departments. This has received high agreement from most people surveyed. However, dilemmas in terms of placing ethnic minority issues at the forefront in the national education system were identified as limitations in a constitutional capacity [44].

The economic conditions surveyed reveal both improvements and difficulties in supporting access to quality education for ethnic minority people. The finding first discloses the satisfactory to good preparation of infrastructure for the education of ethnic minorities at a tertiary level. Previous studies (for example [7,8]) recognize that the main infrastructure, including schools, classrooms and sanitary systems, are in the progress of fulfilling the standard for all levels of education for ethnic minorities. Notably, 100% of communes in Tuyen Quang have schools for pre-, primary and lower secondary education levels. Semi-boardings, boarding, vocational and preparatory schools are increasing in number. However, economic difficulties remain an obvious hindrance to the access to quality education

of ethnic minorities. Moreover, despite enjoying a low cost or free-of-charge education, the access to education of ethnic minorities is far lower than that of the Kinh at all levels (Figure 2).

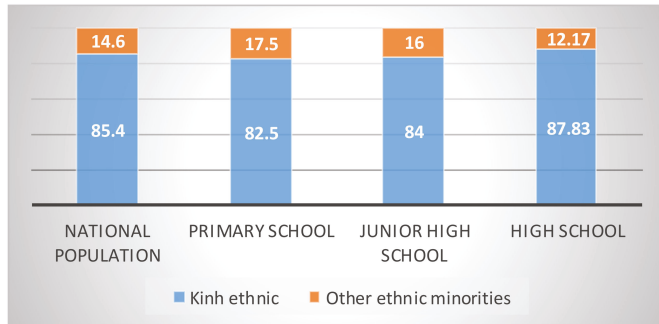


Figure 2. Access to education in Vietnam in 2014 [45].

Previous statistics confirm the financial hardship of ethnic minority communities by claiming that, by accounting for 15% of the population of the whole country, ethnic minorities take up 47% of the poor and 68% of the extremely poor. Some of the reasons for the sluggishness in improving this situation are the harsh geography and natural terrains, which are mostly mountainous. The deprived cultural background of ethnic minority groups, such as due to outdated rituals or opposing customs, is another cause of the slow and hindered economic development in ethnic communities [1,41,46–48].

Socio-cultural conditions that provide multicultural education for ethnic minority people also raise much debate. In the context of multi-ethnic classrooms, it is found that a multi-cultural environment both helps and hinders inclusive education. According to [28], an awareness of the positives and negatives can bring both eagerness and worry in the studied context. On the one hand, teachers are under more pressure to adjust their lessons to suit all ethnic minorities involved in the classroom. This poses challenges to delivering lessons and reduces much motivation of teachers in the face of economic difficulties [49]. Similarly, students may have trouble integrating themselves into the environment [50]. On the other hand, the opportunities for promoting self-identification [51] and equity in the educational system [52] were also found in the respondents' answers. The negatives mentioned affect quality education to a certain extent and thus, the result, in reality, needs more investigation and improvements. As found by [8], social-cultural drawbacks such as a low level of education can entail low-paid employment (65%) and unskilled workers (36%) in ethnic minority communities nationwide. However, the negatives cannot stop ethnic minorities from showing their pride in attending classes. This echoes [8]'s conclusion on the aspiration of many ethnic minorities to attend school. Such a finding can, in return, inspire the Vietnamese government to fulfill the educational rights of ethnic minorities for their comprehensive and sustainable development.

The barriers hinder to a great extent the implications of human rights and thus negatively affect the quality of education for ethnic minorities. This outcome resonates with most research in the related field [8,44,45,53–56]. For gender inequality, the finding makes it clear why, globally, the gender gap index for education attainment in Vietnam in 2020 is ranked 93rd, down five positions compared to 2019 [57,58]. In Asia Pacific, the country ranked 10th in 2019, also seeing a decline compared with other countries in the region [58]. While [44,59] claims that ethnic minority women face a double challenge for representation and participation in formal and informal decision-making structures in families and communities, this investigation finds that such challenges nearly disappear. Ethnic minority women receive more respect and recognition for their abilities and roles. The line between the two genders is also highly agreed to be fading.

Child labor is considered an infringement of the human rights law and is becoming a thorny issue for the Vietnamese government to tackle [57]. Constraining the practice of child labor has many shortcomings because most families in ethnic groups have to send their children into the labor force to make their ends meet [8]. According to [60], in 30% of ethnic minority families, at least one child drops out of school to work, which is a high rate. In Vietnam, the number of students going to school at the right age remains low and the quality of education at each level in several ethnic minority communities does not yet meet the national standard [7].

At the same time, language barriers are perceived as being hard to overcome due to the conflict between the often poor command of Vietnamese among ethnic minority people and the wide availability of materials written in Vietnamese rather than in ethnic minority languages [54]. This sometimes discourages ethnic minority people from taking classes or finishing their programs. It is stated that over 90% of ethnic minority children speak their mother tongues at home. Many of them are barely exposed to the Vietnamese language before the first year of schooling [60]. Accordingly, Vietnamese ethnic minority students have trouble acquiring fluency and comprehension in their class. Simultaneously, teachers of ethnic minority classes encounter similar language conundrums in finding materials and using language in their classes. Such a quandary has led to difficulties in implementing multicultural education and achieving quality education. The protection and preservation of the values of each language are posing many challenges to the government in enforcing ethnic minorities' human rights [8,61]. The removal of other problems, such as family violence and limited vocational skills, was also perceived as significant in their assistance in the implementation of SDG4. This echoes what [8] reveals in his research, which confirms the importance of restricting family violence and upgrading vocational skills for ethnic minority people.

6. Academic and Managerial Implications

Academics and managers working on the educational issues of ethnic minorities for sustainable development should consider the results of this study to reorient their research direction, as well as to improve their management policies. For academic researchers, since the human rights-based approach for ethnic minorities is not widely studied in the Vietnamese academic community, this study can motivate future investigations into questions of how to improve human rights or which human rights should be prioritized for the education of ethnic minorities. In finding out the conditions for SDG4 implications, further research can discuss the extent of mainstreaming gender equality and human rights into educational policies, curricula, teacher education and student assessment so as to fit the general indicator of Target 4.7. The obstacles that this study examined can ignite some ideas about measuring equality in education using the parity indices, including indigenous versus non-indigenous, male versus female, rural versus urban and bottom versus top wealth groups, so as to fit the general indicator of Target 4.5.

Another noticeable issue that has emerged and which would benefit from further research is multicultural education. In the context of Vietnam, multicultural education for ethnic minorities receives little interest, despite its significance in creating a breakthrough in the education of ethnic minorities and ensuring human rights. In terms of managerial implications, firstly, the research has revealed the high compatibility of SDG targets and elements of human rights, confirming the righteousness in the nationalization of the SDGs in the Vietnamese context. This encourages more actions in making laws, policies and strategies appropriate and detailed for ethnic minority communities so that equality and no discrimination in education for every citizen of the country can be achieved. Furthermore, the Vietnamese government should adjust the legal system of Vietnam with more effective laws, strategies and policies to better suit the needs of ethnic minorities in education. For managers in the education field, this research provides some ideas in adjusting curricula, teaching and learning textbooks in order to lessen the negative attitudes and misconceptions about ethnic minorities. The inclusion of positive contents and inspiring images about ethnic minorities in educational materials should be seriously considered. More significantly, the research raises an awareness of the barriers that impede

the implications of SDG4 for ethnic minorities. Thus, policymakers should be aware that they must deal with child labor, language, gender inequality and other barriers to education.

7. Concluding Remarks

Since education is the leading factor for the development of the whole country, especially of ethnic minority groups, implementing SDG4 among ethnic minorities and enforcing human rights is an unavoidable but intimidating task for both the Vietnamese government and Vietnamese people. From this perspective, this study helps to provide a better insight into the compatibility between the targets of SDG4 and the elements of human rights for ethnic minorities. This study confirms that coordinating the implications of all the targets can satisfactorily ensure the legal rights of ethnic minorities. The Vietnamese government has also shown all-round preparations for the implementation of SDG4 in terms of the economic, legal political and socio-cultural conditions for ethnic minority communities. Moreover, provoking the motivation of ethnic minority groups and encouraging participation is vitally important due to its positive impact on sustaining the spirit of ethnic minorities. Though challenges remain, particularly due to the language barrier, child labor and gender inequality, considerable efforts to improve them have been recognized.

The limitations of this research lie in several aspects. Firstly, the jurisprudence method encountered trouble in terms of access to the legal documents, so the finding concerning compatibility is fairly limited. Secondly, for the exploratory method, the quality of data analysis was influenced by the assignment of different groups to different questions. The overlap of answers made it quite confusing to classify a few questions into the proper section for analysis. Furthermore, a limitation can be found in the number of respondents who were selected from one university in one mountainous province in the north. This constrains the generalization of the findings. Finally, due to the limited scope of the study, only four conditions and three major barriers were analyzed in general. This may restrict the overview of the hardship that the implementation of SDG4 has faced and somehow underestimate the real situation. However, these limitations can provide perspectives for further research. Particularly, further studies with a larger sample of educational institutions from pre-school, primary and upper levels all over Vietnam, or other multi-ethnic countries, might be undertaken to triangulate the research findings. Further studies might also focus on more specific conditions, such as the infrastructure in the economic area. Other barriers could also be explored in more detail.

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Article

How Digital Natives Learn and Thrive in the Digital Age: Evidence from an Emerging Economy

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Abstract: As a generation of ‘digital natives,’ secondary students who were born from 2002 to 2010 have various approaches to acquiring digital knowledge. Digital literacy and resilience are crucial for them to navigate the digital world as much as the real world; however, these remain under-researched subjects, especially in developing countries. In Vietnam, the education system has put considerable effort into teaching students these skills to promote quality education as part of the United Nations-defined Sustainable Development Goal 4 (SDG4). This issue has proven especially salient amid the COVID–19 pandemic lockdowns, which had obliged most schools to switch to online forms of teaching. This study, which utilizes a dataset of 1061 Vietnamese students taken from the United Nations Educational, Scientific, and Cultural Organization (UNESCO)’s “Digital Kids Asia Pacific (DKAP)” project, employs Bayesian statistics to explore the relationship between the students’ background and their digital abilities. Results show that economic status and parents’ level of education are positively correlated with digital literacy. Students from urban schools have only a slightly higher level of digital literacy than their rural counterparts, suggesting that school location may not be a defining explanatory element in the variation of digital literacy and resilience among Vietnamese students. Students’ digital literacy and, especially resilience, also have associations with their gender. Moreover, as students are digitally literate, they are more likely to be digitally resilient. Following SDG4, i.e., Quality Education, it is advisable for schools, and especially parents, to seriously invest in creating a safe, educational environment to enhance digital literacy among students.

Keywords: socio-economic status; parental education; digital literacy; digital resilience; Vietnam; quality education; Sustainable Development Goal 4; digital age; bayesvl

1. Introduction

Digital literacy is one of the driving forces in the development of the digital age, as well as a critical pillar of general education. To promote Sustainable Development Goal 4 (SDG) - Quality Education, developed countries have introduced digital literacy into general education so that the majority of their citizens become an active element of the digital economy [1]. However, in less developed nations, the issue is neglected, while the context here is more complicated. There is a lack of legal regulations as well as formal education and training for youth [2]. In Asia, Internet ‘addiction’ has been popular among adolescents in countries, and Internet use, therefore, is frequently characterized by risky cyber behaviors [3]. As a typical example of the region, according to statistics from the University World News [4], Vietnam has about 68.17 million Internet users in 2020, an increase of 10% over 2019. An average Vietnamese person spends up to 11 hours a day on the Internet, social media, and consuming digital content; therefore, they have become more and more comfortable with the omnipresence of technology [5]. On the other hand, this might create more chances for online risks and negative influences on society. Notably, digital safety related content is almost absent from official Information Technology (IT) programs in Vietnamese schools [6]. In fact, IT subject is treated as an elective subject in the Vietnamese education program, and is not compulsory in all primary school, middle school, and high school levels. Consequently, there is a lack of focus on digital literacy in elementary education in Vietnam.

Nowadays, students seem to have different perceptions about learning digital tools than past generations. This is tied to the idea that individuals born in the late twentieth and early twenty-first centuries are said to be “born digital” and spend their entire lives immersed in digital culture [7,8]. In other words, they have become a ‘digital native’ generation. Fostering a sense of responsibility and digital resilience among young people, therefore, is a crucial component amid the Fourth Industrial Revolution. Previous findings define digital resilience as the skill that will encourage young people to look at the positive and negative experiences they have online, consider the impacts they may have, and devise ways to build digital safety [9].

The 2020 outbreak of the COVID–19 Coronavirus disease has been pushing students worldwide in general and Vietnamese students, in particular, to adapt to online learning [4], especially as most schools and educational institutions have been closed in Vietnam since the beginning of the Lunar New Year. However, spending more time online could bring both beneficial and harmful effects on young generations. Engaging in online activities, in certain circumstances, can make a young person feel upset, uncomfortable, or left out. On these occasions, they need support from adults: either their parents or experts [10]. This issue thus leads to a question of how aware the students are of their digital resilience.

Students’ perceptions of the application of online learning are crucial as a new era of digital technologies is coming. A study on the delivery of a distance learning module in a University in the North of Italy shows that there are five themes of the online learners’ perspectives, which are teamwork, cognitive, operating, organizing, and emotive/ethic for the positive aspects of e-learning to be improved [11]. They have a potential impact on developing collaborative activities for students in distance learning. Digital literacy, therefore, might have an important role in helping students to achieve a better outcome from online learning methods. The unexpected switch to online learning amid the COVID–19 pandemic also requires more attempts from the authorities to ensure educational quality and inclusiveness as well as to build a safe learning environment so each student can meet the SDG4 target.

Therefore, this study aims to identify and understand the relationship between digital literacy and digital resilience and the students’ socio-economic status, family background, gender, and school location. It should contribute to the ongoing development of the education system in Vietnam society. Utilizing a dataset of 1061 Vietnamese students [12] chosen randomly from the North to the South of the country with an employment of the Bayesian approaches, our findings would shed light on the

positively and negatively associated factors to digital literacy and digital resilience as a necessary skill of future global citizens.

In the following sections, a literature review and details of the data analysis will be presented. Limitations and potential implications of the research will be discussed in the final section of the paper.

2. Literature Review

2.1. Family Background and Students' Digital Literacy and Resilience

One of the factors affecting students' digital literacy is their family socioeconomic status (SES). Results from previous studies show that family socioeconomic status has a moderate, positive relationship with students' digital competence [13]. Economically advantaged families with more books at home and parents with more cultural capital are identified as decisive factors to the level of children's digital literacy [14,15]. In the Vietnam case, the country has witnessed rapid economic growth, transforming from one of the world's poorest nations into a lower-middle-income country [16]. As the emerging Vietnamese middle-class has reached 13% of the population recently, the level of education has been improved for Vietnamese households in general. According to the World Bank, the coverage and learning results of Vietnamese are higher and equitably achieved in primary schools. The evidence is represented by the remarkably high scores in the Program for International Student Assessment (PISA) in 2012 and 2015, where the performance of Vietnamese students exceeds that of many countries in the Organization for Economic Co-operation and Development (OECD) [16].

In contrast, students from lower socio-economic backgrounds are often at a disadvantage to achieve higher digital competences. According to Robinson [17]'s research, students from less wealthy families have less accessibility to modern technologies than students from a moderate-richer family background, which limits them from reaching their full potential in developing their digital skills. Thus, the socio-economic status seems to be the most significant predictor of students' digital skills [18,19]. An explanation is that only parents with higher economic status are perceived as being supportive of their kids in using digital tools and developing IT skills [19]. Children who have existing socio-economic benefits tend to gain more significant benefits from online use than those who do not [20].

The education level of parents is also extensively discussed in relation to the development of students' digital literacy. A previous study reports a significant association between students' awareness of IT literacy and their mothers' educational qualification [21]. Mothers with better educational attainment could guide and support their kids' digital tools, which lead to their better performance in IT [22]. Students who achieve better results are often significantly supported by mothers in socially advantageous families [23]. Similarly, 15-year-old students who have a father with higher education also score higher on IT tests than those who have fathers with no or lower educational attainment [24]. Similarly, secondary students' digital literacy is also stated to be significantly impacted by the father's highest qualification [25].

Later research provides strong evidence on the positive relationship between parent's education level and their children's Internet skills [26], the result is supported by [18] that children's school IT achievement increased in correspondence with their increased parental educational qualification. More evidence is provided by Diogo and colleagues that parents with a higher academic level provide their kids more support in homework even without digital tools [23]. On the other hand, research indicates that in the case of parents who occasionally use the Internet, the children tend to be more passive or fatalistic when confronted with online risks [27]. As a result, occasional Internet users feel less confident in advising their children about digital-related topics.

The contrary views in previous studies lead to a question of whether parents with higher academic levels have a sufficient level of digital literacy and are able to protect their children from online risks.

2.2. Gender and Students' Digital Literacy and Resilience

The findings of whether or not gender is a factor affecting students' digital literacy are inconsistent. While some scholars have found that there are no significant relationship between gender and IT skills [28] or no gender differences [14,29], other studies have revealed that females seem to be less confident of their abilities compared to males [26,30]. In the study [31], the total average score of males' information literacy is much higher than females in some areas, which includes recognizing the need for information, evaluating, interpreting, towards accessing the gained information legally and ethically. Other studies also report that schoolboys show better results in Internet skill application [32,33] and tasks that required advanced digital skills (such as programming, coding) than girls [34]. Moreover, results in performing tasks required sophisticated digital skills to find that females' self-assessment to be lower than those for males [35].

In contrast, an investigation on digital performance shows that females perform better with digital information tasks comparing with males [36,37]. This finding is supported by the evidence-based result of the Australian 10 grade ICT literacy assessment, which shows that schoolgirls have a significantly higher level of ICT scores than boys [38].

In terms of resilience, previous studies also indicate that females are likely to be more resilient than males [39,40]. Supporting females' higher resilience notion, a survey with Italian students on school bullying involvement presents that male students are likely to have higher levels of dispositional resilience alienation, and female students show a higher level of dispositional resilience positivity [41]. In other research, the idea that females are more likely to seek out and receive support than boys are reported only as a predictive explanation [42]. Boys, therefore, are likely to try to fix the problems faced themselves as soon as possible, more than girls [43].

On the other hand, Liu and Sun [31] research find equality in mastering information knowledge of both female and male learners.

From this body of literature, it can be seen that the relationships between gender and digital literacy, as well as digital resilience, are questionable and still mostly ambiguous. Thus, further study is needed to clarify the gender differences in students' digital literacy and digital resilience.

2.3. School Location and Students' Digital Literacy and Resilience

There are conflicting results from previous works about the difference between urban and rural groups of students in using digital tools for learning together with their digital literacy and digital resilience.

A survey of grade 10 students in Malaysia finds that urban school students have a significantly higher level of essential IT, advanced IT, and Internet applications than their rural counterparts [29]. In China, with a similar finding, the predictive reason is that the digital facilities either at home or in schools are likely better in urban schools than those in rural schools, as urban schools have access to a higher level of funding for digital facilities than rural schools [44]. One study also finds that urban students show more digital experience, while rural students have lower Internet use for learning due to their shortage of technology experience [44]. Another example: on average, young Korean students studying in elementary schools located in major cities show higher digital literacy than those in rural schools [45]. According to this study, there is a significant gap between rural students and urban students in terms of digital competence.

However, earlier investigation reports that learners in the lower grades of schools located in rural provinces have better IT literacy achievement than ones studying in major cities [46]. This is due to a more significant technology investment by governments in those disadvantaged provinces.

Hence, the issue of whether or not school location is a factor affecting the level of students' digital literacy and resilience is a controversial topic and requires more research.

Regarding the context of Vietnam in 2018, Vietnet-ICT surveys the Internet safety education in school on 420 students in 12 cities and provinces and finds that 67 percent of students begin using the Internet when they are 3–12 years old and that 75 percent have been using social networks [47]. Their

results show urgency in educating children on how to use the Internet in a safe and civilized way from a very early age. However, it seems that the content taught in IT classes evolved too slowly compared to the rapid development of technology [6]. In later life stages, it is also stated that human resources in IT do not meet the requirements of the labor market [6]; therefore, the renovation of the general education program for digital literacy has become an urgent issue.

Based on the inconsistencies in the current body of literature and the alarming situation of Vietnam as well as other countries, this study aims to evaluate the students' digital literacy and resilience based on the relationship with their family background, including social, economic status (SES), parents' education, gender, and school location. Based on this, the research questions follow:

RQ1: What are the relationships between students' socio-economic status, parents' education, and their digital literacy and resilience?

RQ2: What is the relationship between students' gender and their digital literacy and resilience?

RQ3: What is the relationship between students' school location and their digital literacy and resilience?

3. Materials and Methods

3.1. Materials

The study uses a dataset from the "Digital Kids Asia Pacific (DKAP)" project, which is publicly available in [12]. The dataset investigates 1061 Vietnamese students on digital literacy and resilience. They are 10th grade students in the academic year 2018/2019, chosen randomly from five provinces, which represent different regions from the North to the South of Vietnam. Data collection and its coding are processed from September to December of the same year, including the pilot with secondary students in Hanoi in April 2018.

We first focus on the *Digital Literacy* domain, which consists of 14 question items to examine how well students could use digital tools responsibly, effectively, and critically evaluate digital information. Next, we assess the *Digital Resilience* domain, which consists of 14 question items to understand how well students could protect themselves and others from online risks and how well they could recover and learn from risky situations. All question items of the two domains above are formed in a 4-point Likert scale that ranges from 'disagree a lot' (1) to 'agree a lot' (4). Both questions and participants' responses are codified into variables and variable categories in our dataset [48].

The analysis contains the following variables in Table 1 below. Observations with no sufficient data are treated as 'NA' (not applicable) in the data analysis. However, there are several observations that are missing data on digital resilience and literacy, and digital resilience and literacy level are interval data, so we add the average score of all students to the missing areas to avoid omitting them. In general, we extract 1061 observations on the digital literacy and resilience levels of 10th-grade students in Vietnam from the dataset, of which 53.1% were girls, and 46.9% were boys. A total of 544 responses (51.3%) are collected at rural high schools, while the other 517 responses (48.7%) are collected from urban high schools. The average education level of students' mothers (4.0) is slightly higher than that of student's fathers (3.9).

Table 1. Variables and definition.

Coded Variables	Term Used in the Paper	Definition of Variables
"sex"	Gender	Using the data from the question 'f1' (Which is: Are you a girl or a boy?) in the dataset. Indicate the gender of students. The variable consists of two values: 1 = girls, 2 = boys.
"ecostt"	Economic Status	The economic status of the students' family. Using the data from the question 'h4_1', 'h4_2', 'h4_3' (Which are: Do you have cars, television, bathrooms with a bathtub or shower at home?). The variable consists of two values: 1 = No, 2 = Yes. We sum up a total of 3 questions; the higher the number is, the better the economic status of the student's family is.

Table 1. Cont.

Coded Variables	Term Used in the Paper	Definition of Variables
"edumot"	Education level of Mother	Using data from question 'h2' in the dataset. The variable consists of six values: 1 = No education, 2 = Primary, 3 = Lower secondary, 4 = Upper secondary, 5 = Post-secondary, 6 = Master/Doctoral and excluding alternative 'I don't know'
"edufat"	Education level of Father	The education level of the father. Using data from question 'h3' in the dataset. Values are the same as "edumot".
"Location"	School Location	Using whether in 'urban' or 'rural' area.
"DL"	Digital Literacy	An independent variable represents the digital literacy of students in the Digital Literacy model, and a dependent variable represents the digital literacy of students in the Digital Resilience model. Employing data from question 'a1' to question 'a14' in the dataset. In the original question, there are four levels (Disagree a lot = 1; Disagree a little = 2; Agree a little = 3; Agree a lot = 4) that indicate how much students agree with the statement; the higher score the student receives, the higher level of literacy of students. To build a new variable "DL", we sum up the total of 14 questions. The questions can be seen in the supplementary file.
"DR"	Digital Resilience	A dependent variable represents the digital resilience of students. Similar to 'DL', 'DR' uses data from question 'b1' to 'b18' in the dataset. The level of digital resilience of students is estimated by summing the score of all the questions. Notably, for the question 'b15' to 'b18' (see Table A1, Appendix A for more details), the score received equivalent to the number of alternatives students selected (e.g., "delete the contract", "talk with parents/caregivers about what to do", "keep looking") excluding the alternative "I do not know".

3.2. Methods

In this paper, we use the Bayesian approach to analyze the data. The main tool used here is R software with the package *bayesvl*, which is available in [49]. The Bayesian analysis techniques, such as the hierarchical model and MCMC, have been successfully applied in education research in Vietnam [50–52]. They allow researchers to facilitate new knowledge without traditional meta-analyses and yield more principled conclusions from each new study [53]. These techniques help to visually demonstrate the results and the distributions of the coefficient, which is suitable for this study. When the model does not show sensitivity to adjustment of the prior, its credibility is proven [54]. Therefore, applying these techniques can enhance user experience and intuitive understanding when constructing and analyzing Bayesian network models [55]. Our research takes advantage of those techniques in exploring the relationship between Digital Resilience, Digital Literacy of students, and their family SES background. There are two models (Digital Literacy, Digital Resilience) demonstrating the association between students' digital literacy, resilience, and the dependent variables based on the Bayesian analysis techniques. The demonstration of models and results is discussed in the following sections.

4. Results

4.1. Effects of Socioeconomic Status, Gender, Parents' Education Level, and the Location of Schools on the Students' Digital Literacy

The formula of the Digital Literacy model (1) is as follows:

$$dl \sim \text{ecostt} + \text{sex} + \text{edumot} + \text{edufat} + (\text{location}). \quad (1)$$

Examples of code that were used to command the *bayesvl* package to construct the Digital Literacy model are as follows:

```

# Design the model

model <- bayesvl()
model <- bvl_addNode(model, "DL", "norm")
model <- bvl_addNode(model, "sex", "cat")
model <- bvl_addNode(model, "ecostt", "norm")
model <- bvl_addNode(model, "edumot", "norm")
model <- bvl_addNode(model, "edufat", "norm")
model <- bvl_addNode(model, "Location", "binom")

model <- bvl_addArc(model, "sex", "DL", "slope")
model <- bvl_addArc(model, "ecostt", "DL", "slope")
model <- bvl_addArc(model, "edumot", "DL", "slope")
model <- bvl_addArc(model, "edufat", "DL", "slope")

model <- bvl_addArc(model, "Location", "DL", "varint")

```

Figure 1 presents the network and design of the Digital Literacy model for the probabilistic dependency among the variables. Code for the plot function to test the design of the Digital Literacy model and the generated Stan code are available in Appendix B.

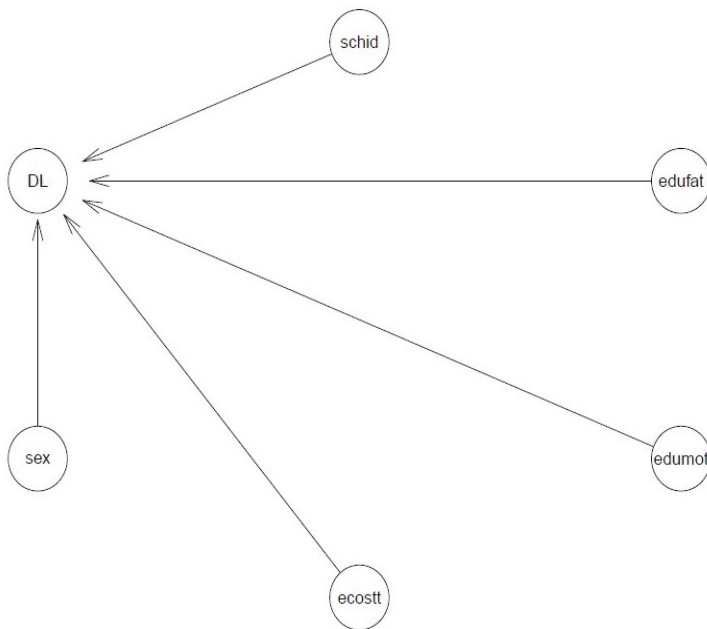


Figure 1. Map of the Digital Literacy model.

The results of the Digital Literacy model are shown in Table 2. The model is verified using the MCMC method, and the chains are shown in Figure 2. Overall, all the chains are resembled, suggesting the autocorrelation phenomenon. Rhat is around 1 (more than 1.1 means problem), and n_{eff} is above 2000 (more than 1000 means good sign). From Figure 2, we can see that the convergence of our model is good.

Table 2. The results from the hierarchical Digital Literacy model.

4 Chains, Each with Iter = 5000; Warmup = 2000; Thin = 1; Post-Warmup Draws per Chain = 3000, Total Post-Warmup Draws = 12,000.										
	mean	se_mean	Sd	2.5%	25%	50%	75%	97.5%	n_eff	Rhat
b_sex_DL	-0.15	0.00	0.30	-0.73	-0.35	-0.15	0.05	0.45	8993	1
b_ecostt_DL	0.48	0.00	0.24	0.01	0.32	0.48	0.64	0.96	7990	1
b_edumot_DL	0.20	0.00	0.18	-0.15	0.08	0.20	0.32	0.55	6729	1
b_edufat_DL	0.08	0.00	0.18	-0.28	-0.05	0.08	0.20	0.44	6574	1
a_Location[1]	39.88	0.01	1.27	37.38	39.02	39.88	40.75	42.34	9337	1
a_Location[2]	40.50	0.01	1.34	37.87	39.59	40.51	41.41	43.08	9684	1
a0_Location	21.22	0.22	11.73	-1.07	12.77	20.77	30.17	40.87	2751	1
sigma_Location	14.52	0.15	7.64	0.51	9.41	14.85	19.75	29.05	2724	1

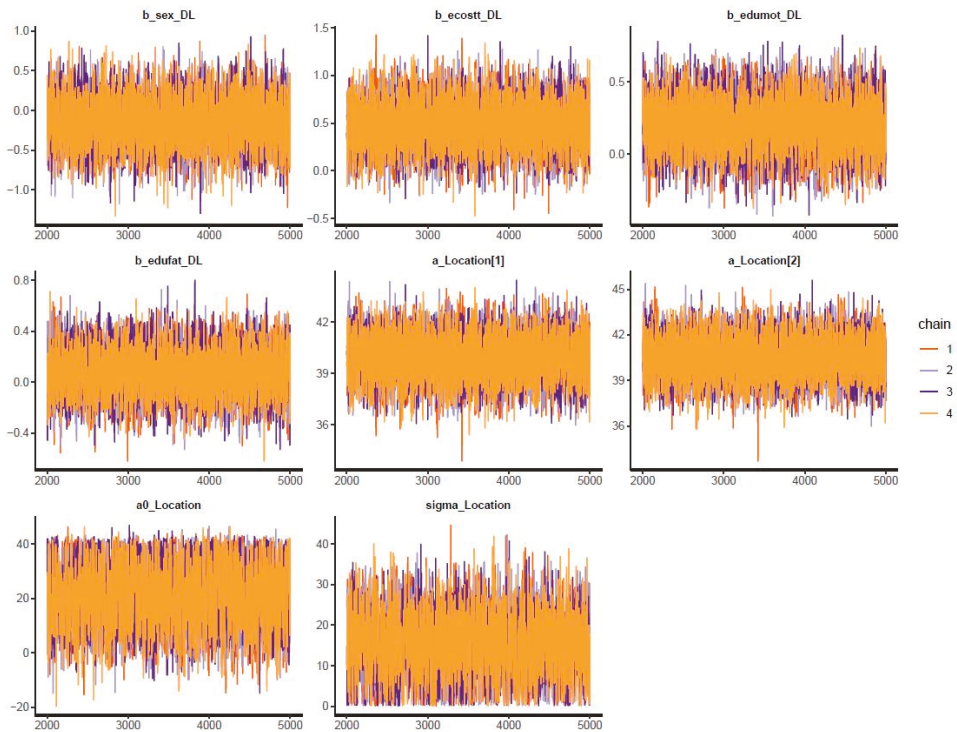


Figure 2. The MCMC chains for the Bayesian model of Digital Literacy.

Figure 3 displays the density and value of SES status, gender, mothers’ education level, and fathers’ education level to students’ digital literacy. The SES status has a positive association with the level of students’ digital literacy (mean = 0.48). The distribution of *b_edumot_DL* (mean = 0.2) and *b_edufat_DL* (mean = 0.08) are narrow with a high density, which indicates a firm association between the parents’ education and students’ digital literacy (the mother’s education has more impact than the father’s). The ‘sex’ coefficient lies in the negative zone of Figure 3 value’s bar (mean = -0.15), which represents a weak association between students’ gender and the students’ digital literacy (girls’ digital literacy is slightly higher than boys’).

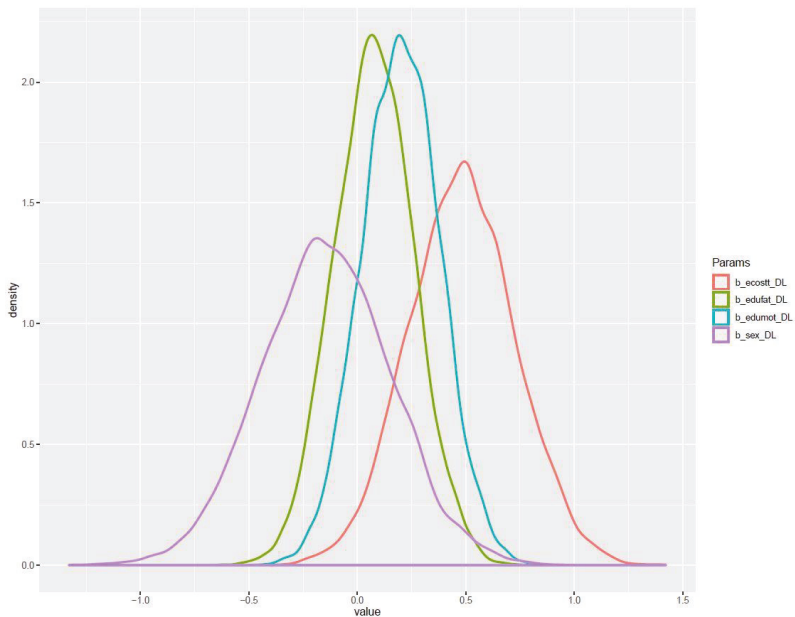


Figure 3. Posterior coefficients of the Digital Literacy model.

The students from an urban area ($\alpha_{a_Location[2]} = 40.50$) have a higher level of digital literacy than their counterparts from rural ($\alpha_{a_Location[1]} = 39.8$). However, the difference is relatively small. Hence, the results indicate that students have a fairly similar level of digital literacy regardless of where their school is located.

4.2. Effects of Digital Literacy Level, Gender and School Location on the Students' Digital Resilience

Three direct factors that could have an impact on the students' digital resilience are their digital literacy, gender, and school location. Here we investigate their relationship by using the following hierarchical Digital Resilience model (2):

$$dr \sim dl + sex + (location). \quad (2)$$

Examples of code that are used to command the `bayesvl` package to construct the Digital Resilience model are as follows:

```
# Design the model
model2 <- bayesvl()
model2 <- bv1_addNode(model2, "DL", "norm")
model2 <- bv1_addNode(model2, "DR", "norm")
model2 <- bv1_addNode(model2, "sex", "cat")
model2 <- bv1_addNode(model2, "Location", "binom")

model2 <- bv1_addArc(model2, "sex", "DR", "slope")
model2 <- bv1_addArc(model2, "DL", "DR", "slope")

model2 <- bv1_addArc(model2, "Location", "DR", "varint")
```

Figure 4 presents the network model for the probabilistic dependency among the variables in the Digital Resilience model. Code for the plot function to test the design of the Digital Literacy model and the generated Stan code are available in Appendix C.

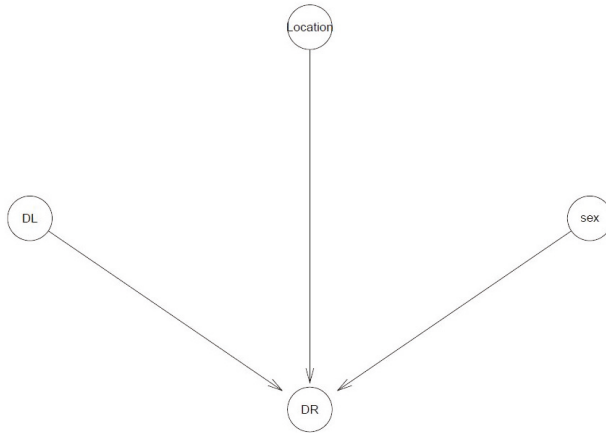


Figure 4. Map of the Digital Resilience model.

The Digital Resilience model is verified using the MCMC method, and the chains are shown in Figure 5. Foremost, we can see that the convergence of our model is suitable as R_{hat} is around 1, and n_{eff} is above 1000. The results of the Digital Resilience model are shown in Table 3.

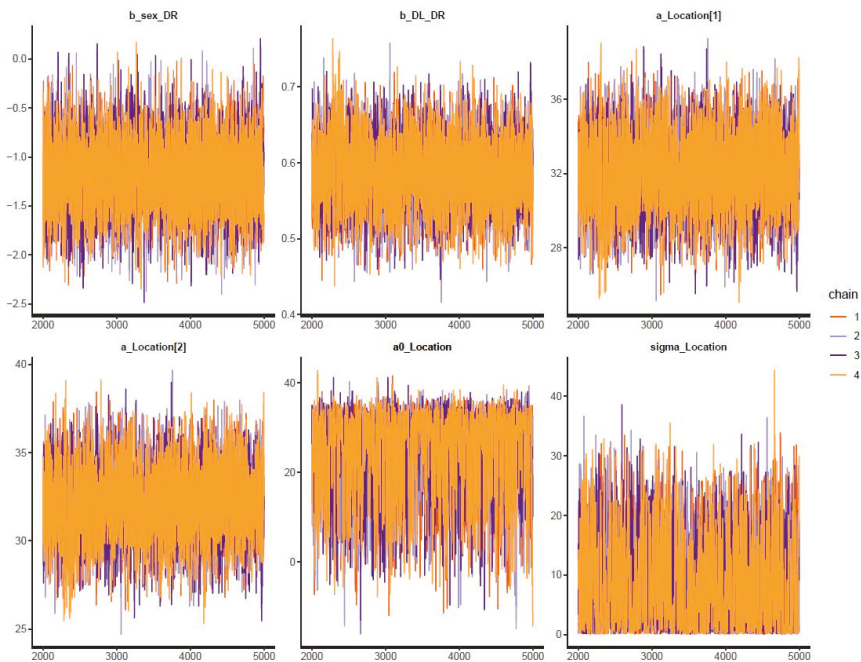


Figure 5. The MCMC chains for the Bayesian model of Digital Resilience.

Table 3. The results from the hierarchical Digital Resilience model.

4 Chains, Each with Iter = 6000; Warmup = 3000; Thin = 1; Post-Warmup Draws per Chain = 3000, Total Post-Warmup Draws = 12,000.										
	mean	se_mean	Sd	2.5%	25%	50%	75%	97.5%	n_eff	Rhat
b_sex_DR	-1.17	0.00	0.38	-1.91	-1.43	-1.17	-0.91	-0.42	7792	1
b_DL_DR	0.59	0.00	0.04	0.50	0.56	0.59	0.62	0.67	5920	1
a_Location[1]	32.08	0.03	1.97	28.21	30.77	32.06	33.42	35.95	6029	1
a_Location[2]	32.15	0.03	2.01	28.21	30.81	32.13	33.52	36.10	5998	1
a0_Location	24.02	0.28	9.59	0.76	17.77	27.73	31.40	35.16	1214	1
sigma_Location	7.91	0.21	7.33	0.13	1.19	5.94	13.23	24.27	1204	1

Figure 6 displays the correlation between students’ digital literacy, gender, and digital resilience. The distribution of b_{DL_DR} is narrow (mean = 0.59), with an excellent credibility range, suggesting a positive association between the students’ digital literacy and resilience.

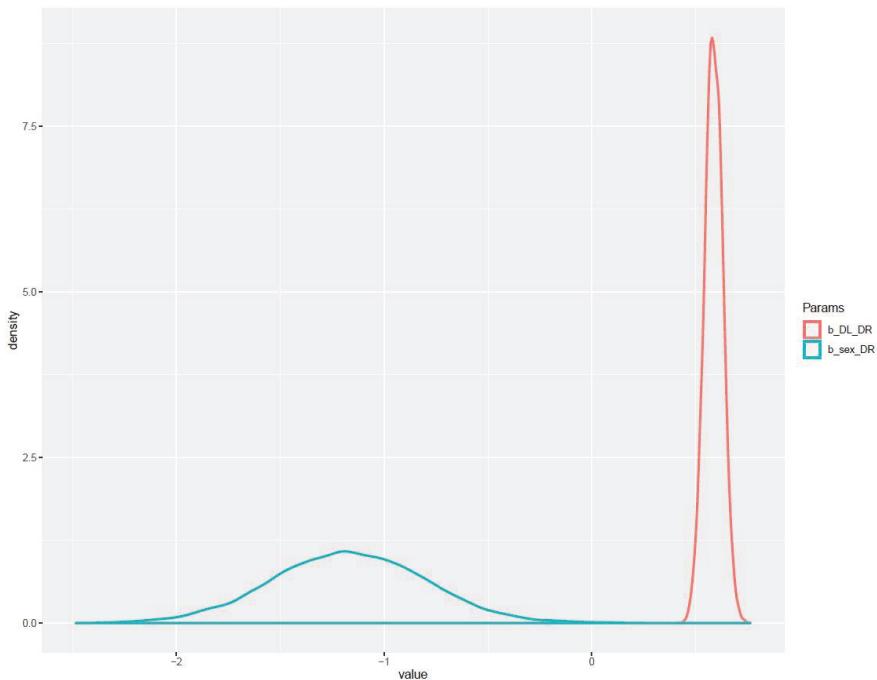


Figure 6. Posterior coefficients of the Digital Resilience model.

On the other hand, even though the standard deviation of b_{sex_DR} is relatively high, the distribution completely falls in the negative zone (mean = -1.17), which indicates that girls are more likely to obtain digital resilience than boys.

Both coefficients of variables representing rural area ($\alpha_{a_Location[1]} = 32.08$) and urban area ($\alpha_{a_Location[2]} = 32.15$) are not very different from each other. Thus, they suggest that those students are digitally resilient, regardless of their location.

5. Discussion

Our study shows that students’ digital literacy and resilience have a correlation with their family background and gender but little correlation with their location. Another significant finding is the

positive relationship between students' digital literacy and digital resilience, which will be discussed in the following sections.

5.1. Family Background and Students' Digital Literacy

What are the relationships between students' socio-economic status, parents' education, and their digital literacy and resilience?

The results of this study show that there is a positive correlation between family socioeconomic factors and students' digital literacy. In Vietnam [16], more students nowadays have the chance to access to the Internet. In congruence with past findings, students who have more access to the Internet might have better chances to improve their digital literacy than the others. This ties in with the findings in the previous studies stating the importance of family cultural capital for secondary school students' digital competence [56].

In addition to SES status, parents' education also shows a positive association with students' digital literacy. The explanation for this is that digitally skilled parents can guide their kids to use computers in comparison with those parents with lower digital literacy. Schunk and Pajares [57] state that children more likely to achieve success in school have more time spent with their parents in school-related activities. In previous studies by Trung T., et al. [58] and Le, et al. [59], family and a scholarly culture at home have been proved to be essential for fostering children's reading habits; the parents are the role models, motivators, and facilitators for their children. Similar to previous studies, digitally skilled parents are believed to encourage their kids more frequently to explore the Internet or software such as PowerPoint to create their learning products [23]. Data also shows that mothers' education seems to have a higher association with the child than fathers' education. This result is relevant to the previous finding that the education level of the mother (having a university diploma or higher) strongly enhances the academic performance of students [59]. Given the circumstances of Vietnamese culture [50,52], it can be the reason that the mother more often stays at home and spends more time with a child than the father. In this digitalization era for an emerging economy, it is critical for the youth to develop their creativity and innovation, partly by utilizing online tools, rather than relying on capital or physical resources [8]. Therefore, based on these findings, it might be the case that campaigns to enhance students' digital literacy should also include instructions to parents regarding how they should carry out the experience of digital tools usage.

5.2. Gender and Students' Digital Literacy

What is the relationship between students' gender and their digital literacy and resilience?

Results from the Bayesian analysis show that girls obtain higher digital literacy and, especially, digital resilience than boys. This result is contrary to that of previous studies that found no significant relationship between gender and IT skills [23] or no gender differences [45]. However, it is consistent with other findings that there was a variation in digital literacy related to gender, which has been illustrated in many previous studies, several of which highlight the advantage of males [31–35], while others underline that of females [36–38]. In a recent study, researchers reveal that gender is not associated with differences in digital attainment [60]. It is likely that there has been a vivid change within the gender gap in the new digital generation. Moreover, perceptions from modern parents, teachers, and society might have influenced the students' readiness to enhance digital literacy, regardless of any self-perceptions from boys or girls.

Both boys and girls at the secondary school level need help to develop better digital skills and protect themselves from online risks. Digital technologies will continue to develop strongly in the future, with a fast pace predicted. Therefore, gender inequity in digital literacy is likely to happen in such less developed countries if there is no support from the authorities. Digital fluency and gender equity will need to be carefully and continuously evaluated in order to create a balanced, digitalized society.

It will also be crucial in order to formulate further measures aimed at studying how to shorten the gender gap in students' digital literacy for other less developed countries.

5.3. School Location and Students' Digital Literacy

What is the relationship between students' school location and their digital literacy and resilience?

A feature worth noting is that school location does not have an association with Vietnamese students' digital literacy. The evidence shows that even though the students from urban areas do have higher digital literacy than students in a rural area, the difference is insignificant. The widespread availability of the Internet might have been a contributor to this new feature as students from almost everywhere in Vietnam can have accessibility to knowledge via online platforms. The number of Internet users in Vietnam ranks 25 th in top countries of the world in 2019 [61], which represents the significant widespread of the Internet across the country. Our result has then proved to be different from the previous studies, which suggested that geographical location is evaluated as a factor affecting the digital skill gap of the students [62]. Our evidence also shows that there might be more equality in the distribution of IT education in both rural and urban areas. The Vietnam Ministry of Education and Training has issued a new general education program with Circular No. 32/2018/TT-BGDĐT [63], which addresses IT subject as a compulsory subject, starting to be taught officially in schools from grades 3 to 12. According to the new general educational program, IT skills will play a key role in preparing students with the ability to receive, expand knowledge, and cautious in the era of digital information, connectivity, and globalization. The expected outcome of this plan is to provide students with knowledge of personal information in digital environments, such as the concept of identity information and personal accounts. It also equips learners with an understanding of the risks of abuse and invading personal information such as how to prevent theft of personal information, prevent fraud, and being bullied in an online environment. Accordingly, the students will know the concepts of commercial software, open sources, and digital intellectual licenses, starting from the 2019–2020 school year. With this new policy, more students will be educated towards digital literacy, regardless of their location.

5.4. Digital Literacy and Digital Resilience

Results from the Digital Resilience model show a positive correlation between the students' digital literacy and their digital resilience. In the previous section, the findings from the digital literacy model indicate a positive correlation between the students' digital literacy and their family background, which includes socioeconomic status and the parents' level of education. From both models' results, we notice an indirect connection between the students' family background and their digital resilience; also, the socio-economic status and the level of education from parents might positively relate to the digital resilience of the students. Our study suggests that parents with sufficient digital literacy can help to manage students' online activities and behaviors, observing whenever they encounter online risks. The suggestion ties in with a previous study [27], which highlights the need to promote Internet access and use among the parents, as they might feel more confident in guiding their children on the Internet, promoting a positive attitude towards online safety and proactive coping strategies if they are frequent Internet users themselves. A previous study of 700 U.S. students indicated that these learners need to navigate online risks by communicating with their parents; communication is a requirement of good parenting in a digital generation [64]. Regarding the role of parents in students' Internet usage, Livingstone et al. [65] find a positive association between a parent-children conversation on Internet-related issues and high-school students' concerns about online privacy. Parents play an essential role in their children's learning as those children spend substantial time with them; in doing so, they absorb lessons from their parents in dealing with various social demands and expectations [66].

Our study suggests that students can protect themselves from online risks by being aware of these dangers in advance. Therefore, it is essential to invest in IT education in order to prevent children from encountering online risks. As digital technologies become further integrated into the everyday

life of Vietnamese, young children are potentially exposed to higher risks. A previous study shows that children with low self-efficacy and more psychological difficulties are more vulnerable online as they experience stronger negative feelings and are more likely to only go offline for a while or simply hope that a problem would go away [67]. The authorities need to teach the students how to get away from those negative feelings and from being exposed to sexual risks online such as seeing explicit sexual images or sexual messages. However, there is a problem that students spend much time on the Internet, and their digital literacy sometimes is higher than that of their parents' [68]. Therefore, the parent's ability to manage their children's online activities and protect them from online risks might need additional help from the experts. In this case, they are the teachers, tutors who are experts in digital literacy and having sufficiently pedagogical skills. The findings from Shin and Lwin [2] suggest that teachers' Internet-related discussions at school can reduce students' potential exposure to online risks. Teachers are believed to play a role in stimulating their students to employ proactive problem-solving strategies, as well as teaching them how online tools and applications work [27]. Accordingly, sufficient digital literacy among the teachers themselves is, therefore, essential. As 84% of Vietnamese own a smartphone which has online functions [69], accessing the Internet has become easier nowadays. One must take into consideration that more considerable efforts are needed to teach and control the children's accessibility to information technologies (IT), especially from an early age. It is crucial to develop digital resilience in young generations [70].

6. Conclusions and Limitations

This study aims to advance the knowledge about the relationship between digital literacy and digital resilience and the students' socio-economic status, family background, gender, and school location. The research employs Bayesian statistics to analyze a dataset of 1061 Vietnamese students taken from the UNESCO's "Digital Kids Asia Pacific (DKAP)" project to explore the relationship between the students' background and their digital abilities. The empirical findings not only show the positive correlation between the socio-economic status, parents' level of education, and the students' digital literacy and resilience but also reveal little connection between digital knowledge and skills and the gender factor. Attention should be paid to the positive relationship between students' digital literacy and digital resilience. These empirical results are mostly consistent with previous studies from other contexts, which shows an alignment of Vietnam's situation with the global landscape of students' digital literacy and digital resilience.

At the moment, as digital technologies are considered state-of-the-art and students have more opportunities to use them, providing a safe environment to enhance their digital literacy might need serious investment from multiple stakeholders. This study, therefore, is of considerable significance to provide implications for policymakers, educators as well as parents. Given the proper implementation of a new educational program making the IT subject a compulsory one, the Vietnam Ministry of Education and Training should also work closely with experts from both the education and digital fields to continuously update the content of this subject to catch up with the current trends. This also makes sure that students are equipped with knowledge and skills to exploit information technology as a tool that supports their learning together with protecting themselves from increasing online risks. Educators, especially education management, should encourage the integration of technology in most, if not all, subjects so that students can have more opportunities to practice their digital literacy skills. This cannot be completed without proper training on how students may expose to different types of risks within different contexts of online activities. Additionally, Vietnamese students have shown strong performance in mathematics, science, and innovative domains, which is represented by their high scores in the Program for International Student Assessment (PISA). Although Vietnam's 2018 PISA test data are not included in the reports that compare performance with other countries due to questions about its validity, the country is still regarded as "a positive outlier in absolute scores conditional on its low level of GDP" [71]. This strong foundation of math, science, and innovation knowledge can also help to leverage the digital literacy and resilience abilities of the students, preparing

them for the development of scientific domains in Vietnam [72]. Last but not least, parents, in particular those from disadvantaged backgrounds, should be supported by education institutions, by improving their own digital literacy, and improving their digital resilience, so that they can better guide their children in these situations. Vietnam aims to achieve Sustainable Development Goals by 2030, and one of its top priorities is to provide quality educational systems [73]. In particular, to achieve this Sustainable Development Goal 4 in this digital age, it is essential to enhance the educational quality of digital subjects for secondary students.

Although significant insights could be obtained from analyzing this dataset, the study is not without limitations. Firstly, the particular location and research objects are chosen randomly and on a small-scale, which are not able to reflect a whole society and its development of digital literacy. Secondly, this paper focuses on Vietnam, specifically, without any comparison to other countries, which may lead to a subjective opinion. These preliminary results, however, do hint at several directions for future research. Our result shows that the family background of the student is positively associated with their digital literacy and resilience. However, the reason why students are being affected by their family background in digital literacy has not been answered yet. Therefore, future studies could focus on the psychological aspect of the students upon the development of their digital literacy.

Moreover, a way to enhance students' digital resilience might come from online learning, which gives the students a chance to practice with digital tools and handling online risks. According to Vu [74], online learning is relatively new in the teaching context of Vietnam, but this mode of learning is catching up quickly; far from being reserved or going against a new way of learning, most of the students who were born in the digital age welcome the changes and are willing to adapt their traditional learning styles. In fact, since the COVID-19 outbreak in Vietnam, most schools have been closed as a measure to prevent the spread of infection [75]. Therefore, these educational institutions have been attempting to move most or all of their curriculum to online platforms.

However, the suddenness of the pandemic might lead to an imbalance in the adaptability of both teachers and learners in different environments. This has created various difficulties for them, especially in posing even more disadvantages and risks for students with low levels of digital literacy and resilience. Depression and stress, therefore, might be the results for those students amid the requirement of digital literacy for online learning. Previous studies indicate a high prevalence of depression and its association with acculturation stress and social connectedness among the students in an international university in Japan [76,77]. The findings highlight the importance of support programs that consider the role of acculturation and social connectedness for the students. E-learning might become an inevitable part of modern society. However, the connectedness and mental health of learners should be taken into consideration for the sustainable development of a country's education system.

There have been many efforts from the scientific community on developing online learning schemes. A study indicates that the improvements of e-learning include: more collaboration between students since some students engage differently, more coordination and organization, better workload management in the group activities, and some technical problems being overcome, such as through updating modifications [11]. In previous studies [78,79], Biasutti also contributes a reliable analysis coding scheme to examine transcripts of online asynchronous discussion groups in university students, which is based on the following indicators: (1) inferencing, (2) producing, (3) developing, (4) evaluating, (5) summarizing, (6) organizing, and (7) supporting. The coding scheme later serves the aim of comparing the processes activated by different online tools. Hence, future research studies can apply this coding scheme to examine the online learning experiences in Vietnamese secondary school students amid the development of e-learning systems.

Overall, this research could be a contribution to the development of a higher education system and called for further studies from Vietnamese researchers. In the chaotic situation of a rapid shift from traditional teaching and learning to online forms amid the COVID-19 pandemic, this could shed light on significant issues to make sure that students benefit from inclusive and equitable quality education as one particular objective of SDG4 [80,81].

Author Contributions: Conceptualization, T.T., V.-P.L. and Q.-H.V.; Data curation, M.-T.H., M.-H.N., T.-D.N. and T.L.N.; Formal analysis, M.-H.N. and T.-H.T.; Investigation, T.T., T.-H.P., T.-T.V. and Q.K.; Methodology, M.-T.H., M.-H.N., K.-L.P.N. and V.-P.L.; Project administration, M.-T.H.; Resources, Q.K., V.-P.L. and Q.-H.V.; Software, V.-P.L.; Supervision, T.T. and Q.-H.V.; Validation, T.-H.P., T.-T.V., Q.K. and Q.-H.V.; Visualization, M.-H.N. and K.-L.P.N.; Writing—original draft, K.-L.P.N., T.-H.T.N., T.-D.N. and T.-L.N.; Writing—review & editing, M.-T.H., T.-H.P. and T.-T.V. All authors have read and agreed to the published version of the manuscript.

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Conflicts of Interest: The authors declare no conflict of interest.

Appendix A. Questions’ Description

Table A1. Questions’ description.

1 Code	2 Description
3 “b15”	4 Employing the question: “How will you react when you are exposed to unwanted, disturbing file or website? Choose all that apply.” However the alternative ‘I don’t know’ was excluded.
5 “b16”	6 Employing the question: “How will you react when you receive unwanted, disturbing messages, including SPAM and embarrassing pictures from someone on your contact list? Choose all that apply.” However the alternative ‘I don’t know’ was excluded.
7 “b17”	8 Employing the question: “How will you react when you find that your personal information is misused, compromised, or acquired without permission online? Choose all that apply.” However the alternative ‘I don’t know’ was excluded.
9 “b18”	10 Employing the question: “How will you react when you are bullied online by friends or others? Choose all that apply.” However the alternative ‘I don’t know’ was excluded.

Appendix B.

Appendix B presents the plot function code and the Stan code for testing the network and design of the Digital Literacy model for the probabilistic dependency among the variables.

To test the design, the plot function can be used. The code can be seen below:

```

# Generate the stan code for model
model_string <- bv1_model2Stan(model)
cat(model_string)

#Fit the model
model1 <- bv1_modelFit(model, DKAP2, warmup = 2000, iter = 5000, chains = 4, cores = 4)
```

The Stan code that were generated by the bayesvl package for the Digital Literacy model:

```

> cat(model_string)

functions{
  int numLevels(int[] m) {
  int sorted[num_elements(m)];
  int count = 1;
  sorted = sort_asc(m);
  for (i in 2:num_elements(sorted)) {
  if (sorted[i] != sorted[i-1])
  count = count + 1;
  }
  return(count);
  }
}
data{
  //Define variables in data
  int<lower=1> Nobs; //Number of observations (an integer)
  real DL[Nobs]; //outcome variable
  int Nsex;
  int<lower=1,upper=Nsex> sex[Nobs];
  real ecostt[Nobs];
  real edumot[Nobs];
  real edufat[Nobs];
  int<lower=0,upper=1> Location[Nobs];
  int NLocation;
}
transformed data{
  //Define transformed data
}
parameters{
  //Define parameters to estimate
  real<lower=0> sigma_DL;
  real b_sex_DL;
  real b_ecostt_DL;
  real b_edumot_DL;
  real b_edufat_DL;
  real a0_Location;
  real<lower=0> sigma_Location;
  vector[NLocation] u_Location;
}
transformed parameters{
  //Transform parameters
  real mu_DL[Nobs];
  vector[NLocation] a_Location;
  //Varying intercepts definition
  for(k in 1:NLocation) {
  a_Location[k] = a0_Location + u_Location[k];
  }
}

for (i in 1:Nobs) {

```

```

    mu_DL[i] = b_sex_DL * sex[i] + b_ecostt_DL * ecostt[i] + b_edumot_DL * edumot[i] + b_edufat_DL *
    edufat[i] + a_Location[Location[i]];
  }
}
model{
  //Priors
  b_sex_DL ~ normal( 0, 10 );
  b_ecostt_DL ~ normal( 0, 10 );
  b_edumot_DL ~ normal( 0, 10 );
  b_edufat_DL ~ normal( 0, 10 );
  a0_Location ~ normal(0,10);
  sigma_Location ~ normal(0,10);
  u_Location ~ normal(0, sigma_Location);

  //Likelihoods
  DL ~ normal(mu_DL, sigma_DL);
}
generated quantities {
  //simulate data from the posterior
  real yrep_DL[Nobs];
  //log-likelihood posterior
  vector[Nobs] log_lik_DL;
  for (i in 1:num_elements(yrep_DL)) {
    yrep_DL[i] = normal_rng(mu_DL[i], sigma_DL);
  }
  for (i in 1:Nobs) {
    log_lik_DL[i] = normal_lpdf(DL[i] | mu_DL[i], sigma_DL);
  }
}

```

Appendix C.

Appendix C presents the plot function code and the Stan code for testing the network and design of the Digital Resilience model for the probabilistic dependency among the variables.

To test whether the design is correct, the plot function can be used. The code can be seen below:

```

# Generate the stan code for model
model_string <- bvl_model2Stan(model)
cat(model_string)

#Fit the model
model2 <- bvl_modelFit(model2, DKAP2, warmup = 2000, iter = 5000, chains = 4, cores = 4)

```

The Stan code that were generated by the bayesvl package for the Digital Resilience model:

```
> cat(model_string2)
```

```
functions{
  int numLevels(int[] m) {
  int sorted[num_elements(m)];
  int count = 1;
  sorted = sort_asc(m);
  for (i in 2:num_elements(sorted)) {
  if (sorted[i] != sorted[i-1])
  count = count + 1;
  }
  return(count);
  }
}
data{
  //Define variables in data
  int<lower=1> Nobs; //Number of observations (an integer)
  real DL[Nobs];
  real DR[Nobs]; //outcome variable
  int Nsex;
  int<lower=1,upper=Nsex> sex[Nobs];
  int<lower=0,upper=1> Location[Nobs];
  int NLocation;
}
transformed data{
  //Define transformed data
}
parameters{
  //Define parameters to estimate
  real<lower=0> sigma_DR;
  real b_sex_DR;
  real b_DL_DR;
  real a0_Location;
  real<lower=0> sigma_Location;
  vector[NLocation] u_Location;
}
transformed parameters{
  //Transform parameters
  real mu_DR[Nobs];
  vector[NLocation] a_Location;
  //Varying intercepts definition
  for(k in 1:NLocation) {
  a_Location[k] = a0_Location + u_Location[k];
  }
}

for (i in 1:Nobs) {
  mu_DR[i] = b_sex_DR * sex[i] + b_DL_DR * DL[i] + a_Location[Location[i]];
}
}
model{
  //Priors
  b_sex_DR ~ normal( 0, 10 );
  b_DL_DR ~ normal( 0, 10 );
```

```

a0_Location ~ normal(0,10);
sigma_Location ~ normal(0,10);
u_Location ~ normal(0, sigma_Location);

//Likelihoods
DR ~ normal(mu_DR, sigma_DR);
}
generated quantities {
//simulate data from the posterior
real yrep_DR[Nobs];
//log-likelihood posterior
vector[Nobs] log_lik_DR;
for (i in 1:num_elements(yrep_DR)) {
yrep_DR[i] = normal_rng(mu_DR[i], sigma_DR);
}
for (i in 1:Nobs) {
log_lik_DR[i] = normal_lpdf(DR[i] | mu_DR[i], sigma_DR);
}
}

```

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Article

Research as a Base for Sustainable Development of Universities: Using the Delphi Method to Explore Factors Affecting International Publishing among Vietnamese Academic Staff

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Abstract: In recent years, the Vietnamese government has put significant effort into the internationalization of research in the higher education system via the use of international publications (i.e., publications indexed by citation databases such as ISI Web of Science and Scopus) in evaluating their academic staff and doctoral students. Academic staff in Vietnam, who traditionally have low numbers of international publications, have thus been pushed to improve their competencies in order to meet the new requirements for research productivity. However, we have little understanding of the factors influencing international publication as perceived by Vietnamese academic staff. This study aims to fill the gap by using the Delphi method. Academic staff with at least one international publication were invited, via purposeful sampling, to participate in a two-round Delphi survey. The survey revealed 14 key factors, which were further classified into three dimensions: “policy-related factors,” “capability-related factors,” and “networking-related factors”. These factors were the key determinants in the success of international publishing, according to the study participants. The findings provide implications for policymakers and university leaders for enhancing the research capacities of Vietnamese universities, forming a basis for the sustainable development of the higher education sector in Vietnam.

Keywords: research; international publishing; sustainable development; university; Vietnam; Delphi method

1. Introduction

Over the past decade, the Vietnamese government has made efforts to increase the research capacity of Vietnam’s higher education system [1–3]. Vietnamese academic staff have been encouraged or, in certain circumstances, required, to submit research to international publications (i.e., publications indexed by citation databases such as ISI Web of Science and Scopus). However, due to a chronic shortage of research competency and skills, along with appropriate supporting policies, many academic staff

face challenges when trying to publish internationally [4]. Despite growing concern from practitioners in Vietnam about the need to support academic staff to be able to publish internationally, there has been limited research identifying the main factors inhibiting international publishing by Vietnamese academic staff. This study aims to fill the gap in the existing literature. Using the Delphi technique, this study explores the factors influencing the capacity to publish internationally, as perceived by Vietnamese scholars who have experience in this area.

The findings of this study provide several contributions to the field. First, even though the study was designed to use empirical findings from Vietnam, other countries, especially non-English speaking and developing countries, may find it a useful model for comparison and benchmarking. Promoting research through publications in internationally indexed journals cited by ISI Web of Science or Scopus is among the top priorities of many higher education systems across the world, including non-English speaking and developing countries (see [5,6]). Research has been identified as an essential function of universities, aside from their traditional teaching functions. Focusing on research will undoubtedly help universities to develop sustainably. Second, policymakers in Vietnam may use the findings of the study as input to their revision of the current macro policy for the academic sector. Third, university leaders can also learn from the results of the study to enable further adjustment regulations at the meso level (i.e., institutional level) for their academic staff.

The paper is structured as follows. In the next section, the prior related literature is reviewed. Specifically, we discuss higher education and research systems in Vietnam; the concept of “international publication” in the context of Vietnam; research performance in Vietnam as seen via international publication databases; and previous studies on factors impacting international publishing by Vietnamese researchers. Subsequently, the Delphi method is described. Next, the findings of the two Delphi rounds are represented. We then discuss the findings and their implications. The final section presents the conclusions and limitations of the study.

2. Literature

2.1. Higher Education and Research Organizations in Vietnam

Traditionally, Vietnam followed the former Soviet model for higher education and research. Thus, the functions of higher education and research were divided, with universities overseeing higher education and training, while research institutes focused primarily on research. At the present time, this model has been adjusted, and the two functions (i.e., higher education and research) are now assigned to both universities and research institutes. According to Vietnam’s Law on Higher Education [7] and Law on Science and Technology [8], universities are institutionalized as both higher education and research organizations, and research institutes have had doctoral education added to their traditional research function. According to the most recent official data, Vietnam had 235 universities in 2017 [9] and 550 research institutes/centers in 2014 [10].

2.2. The Concept of “International Publication” in the Context of Vietnam

Akin to the situations observed in other Asian settings such as Korea, China or Taiwan ROC, international publication in the Vietnamese context has two attributes [11]:

First, it is a publication written in English. Despite being a formerly colonized state of France and a member of the former Soviet bloc countries, Vietnam nowadays prefers to use English to French and Russian. English is regarded as the first foreign language [12,13]. Within the academic landscape, English has gradually become the lingua franca for Vietnamese scholars [14]. When referring to international publications, Vietnamese scholars often assume that these are manuscripts written in English, even though a certain proportion of Vietnamese scholars are still using other languages such as French, Russian or Chinese as their first foreign language. Our search query on the Scopus database (<https://www.scopus.com/home.uri>) on April 14, 2020, revealed that of 70,798 publications identified as

originating in Vietnam, 70,090 were written in English (98.99%). The corresponding figures for French, Russian and Chinese are 376 (0.53%), 150 (0.21%) and 90 (0.13%), respectively.

Second, international publication in the Vietnamese context often refers to articles published in internationally indexed databases such as ISI Web of Science and Scopus, the two most prominent indexed databases, which are used by the most reputable university ranking systems, such as Shanghai Jiaotong, THE, and QS. In Vietnam, over the past decade, there has been an increasing trend toward using internationally indexed databases at both the macro (i.e., governmental or ministerial) level and the meso (i.e., institutional) level. Among the government's initiatives, the establishment (in 2003) and official operation (2008) of the National Foundation for Science and Technology Development (NAFOSTED) was the first-ever initiative at the national level aiming to achieve international integration of research in Vietnam [15]. Inspired by the US's National Science Foundation, NAFOSTED used a peer review committee, whose members are elected from the academic community to evaluate and grant funds for research proposals from the academic sector. NAFOSTED requires grantees to have publications published in journals indexed by ISI Web of Science/Scopus databases as prerequisite conditions for project fulfillment. This is what distinguishes NAFOSTED from other research funding mechanisms in Vietnam, which usually only require domestic publications written in Vietnamese.

Another milestone, which highlights the requirement for international publishing in Vietnam's academic sector, was the new regulation on doctoral education issued in 2017 by Vietnam's Ministry of Education and Training (MOET), as Circular 08/2017/TT-BGDĐT [16]. Specifically, the Circular required Vietnamese academic staff to be the first or corresponding author of at least one ISI Web of Science/Scopus publication to be eligible to supervise PhD candidates. Similarly, a PhD candidate is required to be a co-author of at least one ISI Web of Science/Scopus cited paper in order to graduate. In the following year, new regulations on professorial appointments also used international publication as a prerequisite for the appointment of professors/associate professors [17]. Specifically, a newly appointed professor must have at least five ISI Web of Science/Scopus publications, and an associate professor must have three such publications. In terms of incentives at the institutional level, financial reward for faculty staff who achieve international publication has been the most notable policy applied by Vietnamese universities. As noted by Vuong [15], since 2010, several Vietnamese universities have adopted financial reward policies ranging from USD 650 to USD 10,700 per article published in a journal indexed by the ISI/Scopus databases, depending on the journal's quality.

2.3. Research Performance of Vietnam as Seen from International Publication Databases

The research performance of Vietnam, as seen in international publication databases, is modest compared to neighboring countries [18–20], as illustrated in Table 1. Specifically, among the major Southeast Asian countries, in 2018, the research output of Vietnam (6040 in ISI Web of Science; and 8837 in Scimago/Scopus) only outperformed the Philippines (2042—ISI Web of Science; 3775—Scopus) and lagged behind the other four, including Malaysia (15,615—ISI Web of Science; 33,295—Scopus); Indonesia (7474—ISI Web of Science; 32,456—Scopus); Singapore (14,974—ISI Web of Science; 22,495—Scopus); and Thailand (10,867—ISI Web of Science; 17,943—Scopus).

Table 1. Number of publications of six major ASEAN countries as seen. (from ISI Web of Science and Scimago/Scopus).

Country	ISI Web of Science			Scimago/Scopus		
	Number of Publications in 2010	Number of Publications in 2018	Average Growth Rate 2010–2018	Number of Publications in 2010	Number of Publications in 2018	Average Growth Rate 2010–2018
Malaysia	5963 (2)	15,615 (1)	12.8% (3)	15,810 (2)	33,295 (1)	9.8% (4)
The Philippines	801 (6)	2042 (6)	12.4% (4)	1355 (6)	3775 (6)	13.7% (3)
Indonesia	1039 (5)	7474 (4)	27.9% (1)	2884 (4)	32,456 (2)	35.3% (1)

Table 1. Cont.

Country	ISI Web of Science			Scimago/Scopus		
	Number of Publications in 2010	Number of Publications in 2018	Average Growth Rate 2010–2018	Number of Publications in 2010	Number of Publications in 2018	Average Growth Rate 2010–2018
Singapore	8920 (1)	14,974 (2)	6.7% (6)	15,767 (1)	22,495 (3)	4.5% (6)
Thailand	5257 (3)	10,867 (3)	9.5% (5)	10,192 (3)	17,943 (4)	7.3% (5)
Vietnam	1267(4)	6040 (5)	21.6% (2)	2196 (5)	8837 (5)	19.0% (2)

* Note: -Rankings of respective countries are noted in parentheses. - ISI Web of Science in this table refers to the SCIE, SSCI, AHCI, ESCI and BKCI sub-databases. Source: authors synthesized from [21,22].

Despite the modest performance in terms of absolute numbers of publications, Vietnam is among the highest performing countries in the region in terms of the growth of international publications over the previous decade (see Table 1). Specifically, between 2010 and 2018, the average growth rate in terms of publications cited in the ISI Web of Science for Vietnamese scholars was 21.6%; the respective figure in the Scimago/Scopus database was 19.0%. This is in line with the findings of a recent report by Adams, Pendlebury, Rogers, and Szomszor [23], which indicated that the growth rate of publications indexed in SCIE, SSCI, AHCI for Vietnam is the highest among 14 South and Southeast Asian countries during the period 1981–2018.

2.4. Previous Studies on Factors Impacting International Publishing

Several previous studies, both in the international and in the Vietnamese context, have examined the factors influencing international publication by academic researchers.

For instance, Chang and Chow [24] conducted a survey with 23 Hong Kongese and Taiwanese scholars with experience publishing in top journals in accounting, and found that “Working on interesting and innovative research topics that contribute to the literature”, “Hard work, persistence, motivation and positive attitudes” and “Selecting the right co-authors” were the three most important factors in successful international publishing. Another survey with 14 Chinese authors in management sciences [25] concluded that collaboration, especially with established authors, in conjunction with English academic writing, were key determinants in successful international publishing.

Given the role of English as the lingua franca in the academic sector, publishing in English has become an ongoing issue for scholars worldwide, especially those in non-English speaking countries. This, in turn, has motivated many senior authors to write books to guide junior and/or non-English speaking authors. Some notable texts include those by Corcoran et al., Curry and Lillis, and Wisker [26–28].

In Vietnam, a few studies have aimed to address the factors influencing both international and general publishing (i.e., both domestic and international). Vuong and his associates are among the most active in this field. Using data extracted from the Scopus database in conjunction with data from local sources such as university websites, this research team has produced a series of publications (e.g., see [3,29–33]) about the research outputs of Vietnamese social scientists and related factors.

Of these publications, Vuong et al. [3] is one of the most notable. The study revealed that collaboration with international colleagues resulted in higher productivity among social scholars in Vietnam. The study also determined that authors affiliated with universities tended to have higher performance than those affiliated with research institutes/centers.

However, these studies all relied on secondary data. Notably, the study by Vuong et al. [3] could not examine the underlying factors perceived by academic staff.

Pham and Hayden [34] overcame Vuong et al.’s [3] limitations by conducting in-depth interviews with 20 Vietnamese researchers. Pham and Hayden’s work [34] revealed that English writing competency and funding limitations are among the key factors hindering Vietnamese scholars from publishing internationally.

However, both Vuong et al.'s studies [3] and the work of Pham and Hayden [34] have a common limitation: they only collected data relating to social researchers and ignored their peers in science and technology. This limitation was addressed by Pho and Tran [4], with the participation of 148 Vietnamese lecturers in their survey. However, their work did not separate the opinions of those who had experience of international publication from those who did not. This could affect the validity of the findings since people who have never published internationally might not have a full understanding of the publication process and its difficulties.

This study aimed to fill the above-identified gaps using the Delphi technique to explore factors impacting international publishing via interviews with 35 scholars in science and technology as well as social sciences, who had experience in publishing at least one ISI Web of Science/Scopus cited paper. The research methods are explained in the next section.

3. Research Methods

The Delphi method was used in this study. The method was first developed by RAND Corporation in the 1960s to explore ideas and seek consensus among a panel of experts [35,36]. Nowadays, the method is widely used in a variety of sectors, such as nursing studies [37]; marketing [38]; tourism [39]; urban studies [40]; and education [41]. Given the exploratory nature of this study, using the Delphi method was an appropriate way to address the research goals. According to Keeney, Hasson, and McKenna [37], the Delphi method uses an iterative process to achieve consensus from various experts around a given issue. Since international publication is still a newly emerging and thus, an under-addressed issue in the Vietnamese higher education and research context, consensus among scholars who have experience in international publishing is paramount. The Delphi method usually starts with an interview to explore ideas from experts about the given issue. Based on the results of the interview round (round 1), and in conjunction with literature searching, the researchers then design a questionnaire for the second round. In the second round, experts are asked to complete the questionnaires using a numerical rating scale. They are also asked to provide explanations for their responses and to suggest adjustments to the questionnaires if necessary. Answers and feedback from experts from the first round are used as input for further adjustment of the questionnaire in the next rounds. The iterative process of questionnaire development ends when a predetermined level of agreement among experts is reached [42]. Sometimes, researchers may skip the interview in the first round and the Delphi study then starts with the questionnaires immediately [42].

Participants

Academic staff who had at least one international publication in ISI Web of Science/Scopus indexed journals were selected to participate in this Delphi study. We invited 51 people who satisfied the above criteria. All these 51 potential participants had personal contacts with the co-authors of this study. According to McKenna [43], since a high response rate in successive rounds in a Delphi survey is important, personal contacts with the study's investigators are decisive factors.

Eventually, 35 individuals agreed to participate in round 1 of the study (a 69% acceptance rate). Endacott, Clifford, and Tripp [44] recommended that the appropriate number of participants in a study using the Delphi method is between 20 and 50 people. Thus, our Round 1 panel of 35 participants was satisfactory.

4. Data Collection and Findings

4.1. Round 1

In the first round, we sent an online survey to the 35 participants who agreed to join the Delphi study. Because of its advantage in terms of reducing the time requirements [45], an online survey was selected in this study rather than a traditional pencil-and-paper survey. As all our participants were highly qualified experts, it was assumed that they were familiar with the use of an online survey.

Because of its simple administration and easy to access, Google Form was selected as the tool for the online survey. Google Form has been used in several recent studies (e.g., see [46]).

There were three main groups of questions in the first round survey. The first part of the survey addressed the personal characteristics of the participants (see Table 2). The second part of the survey included 13 five-point Likert scale items pertaining to 13 factors affecting international publishing (see Table 3). These items were developed based on previous studies relating to our topic, including Pham and Hayden [34]; Chang and Chow [24]; Li [25]; Vuong et al. [3]; Ho et al. [29]; Pho and Tran [4]; Vuong and Tran [32]. The third part of the survey was composed of two open-ended questions. The first asked the respondent whether the terminology in the 13 questions in part 2 needed to be modified or adjusted. The second one asked the respondents to suggest new item(s), other than the initial 13 items, which might affect international publication success, according to their experience. The respondent was also asked to provide his or her explanations for any suggestions, whether these related to adjustments or new items.

Table 2. Personal characteristics of the research participants.

Characteristics of Participants	Round 1		Round 2	
	Frequency	%	Frequency	%
<i>Gender</i>				
Male	23	65.7%	15	75%
Female	12	34.3%	5	25%
<i>Age</i>				
26–30	4	11.4%	3	15%
31–35	11	31.4%	8	40%
36–40	12	34.3%	7	35%
41–45	5	14.3%	1	5%
46–50	3	8.6%	1	5%
<i>Degree</i>				
PhD	23	65.7%	10	50%
Masterate	12	34.3%	10	50%
<i>International publication record</i>				
<i>Number of ISI Web of Science/Scopus publications as co-author</i>				
1–2	15	42.9%	6	30%
3 or more	20	57.1%	14	70%
<i>Number of ISI Web of Science/Scopus publications as first or corresponding author</i>				
0	10	28.6%	5	25%
1–2	14	40%	8	40%
3 or above 3	11	31.4%	7	35%
<i>Field of research</i>				
Science, Technology, Engineering or Mathematics (STEM)	18	51.4%	10	50%
Social Sciences, Humanities (SSH) or others	17	48.6%	10	50%
<i>Experience in the academic sector</i>				
Over 15 years	8	22.9%	4	20%
10–15 years	9	25.7%	4	20%
5–10 years	15	42.9%	10	50%
Under 5 years	3	8.6%	2	10%

Table 3. Results of the two-round Delphi study.

No	Item	Round 1 (n = 35)			Item	Round 2 (n = 20)		
		Mean	SD	% of Consensus		Mean	SD	% of Consensus
1	Domestic Scientific documents	3.429	1.092	45.7%	Accessibility of domestic scientific documents *	3.85	0.813	40%
2	International scientific documents	4.914	0.284	100%	Accessibility of international scientific documents *	3.9	0.852	100%
3	Research idea/topic	4.829	0.382	100%	Research idea/topic	4.6	0.503	100%
4	Research data	4.800	0.473	97.1%	Input research data *	4.5	0.688	95%
5	Experimental devices or tools, software for research purposes	4.257	0.817	82.9%	Experimental devices or tools, software for research purposes	4.15	0.671	85%
6	Proficiency in foreign language reading of scientific documents	4.743	0.443	100%	Proficiency in foreign language reading of scientific documents	4.55	0.887	95%
7	Proficiency in foreign language writing of scientific documents	4.657	0.482	100%	Proficiency in foreign language writing of scientific documents	4.65	0.489	100%
8	Accessibility of research funding sources	4.400	0.736	85.7%	Accessibility of research funding sources	4.5	0.761	90%
9	Time available for research purposes	4.457	0.611	94.3%	Time available for research purposes	4.35	0.875	95%
10	Data analysis capability	4.343	0.591	94.3%	Data analysis capability	4.4	0.598	95%
11	Collaboration with domestic peers	4.114	0.718	85.7%	Collaboration with domestic peers	3.5	1.573	80%
12	Collaboration with international peers	4.286	0.667	88.6%	Collaboration with international peers	3.75	0.851	80%
13	Selection of appropriate journal for submission	4.571	0.558	97.1%	Selection of appropriate journal for submission	4.15	0.587	95%
14	/	/	/	/	Research framework **	4.4	0.681	80%
15	/	/	/	/	Having a research assistant (e.g., masters/PhD student) **	4.3	0.571	60%
16	/	/	/	/	Experience and knowledge in responding to reviewers **	4.3	0.657	80%

* Items were adjusted in terms of terminology according to Round 1's respondents' suggestions. ** Items were newly included in Round 2, according to Round 1's respondents' suggestions.

Table 2 presents the personal characteristics of the 35 survey participants. Specifically, among these 35 participants, 23 (or 65.7%) were male; and 12 (34.3%) were female. Most of our participants were 31–35 years of age (11 people, 31.4%) or 36–40 years of age (12, 34.3%). The rest were in the age groups 26–30 (4, 11.4%); 41–45 (14.3%); and 46–50 (3, 8.6%). None of the participants was aged under 26 or over 50. In terms of qualifications, 23 people (or 65.7%) held PhD degrees whereas 12 people (or 34.2%) held master's degrees. All our participants had experience with international publishing. This was particularly important since according to the Delphi method's requirements, participants are required to be experts or experienced people within the topic of the research. However, there was a limitation in that not all participants had published internationally as first or corresponding author (10 people or 28.6%). This limitation will be explained at the end of this paper. Regarding participants' field of research, of the 35, 18 were STEM experts (51.4%) and 17 were SSH or other experts (48.6%). In terms of experience in the academic sector, those with 5–10 years' experience were the largest proportion (15 people, 42.9%), followed by 10–15 years (9, 25.7%), over 15 years (8, 22.9%), and under 5 years (3, 8.6%).

The main results of Round 1 are presented in Table 3. Along with the mean and standard deviation pertaining to each item, Table 3 also represents the proportion of consensus, which is an indispensable part of the use of the Delphi technique. According to Keeney, Hasson, and McKenna [47], an item is defined as reaching consensus among participants in a Delphi study when at least 75% of respondents score strongly agree (i.e., 5 on a 5-point Likert scale) or agree (i.e., 4 on a 5-point Likert scale). As shown in Table 3, of the 13 items, 12 reached the predetermined consensus level of 75%. The only one that did not reach consensus was “Domestic scientific documents” (item 1). Three items (1, 2 and 4) received

suggestions for adjustment in terms of terminology, and an extra three (items 14–16) were suggested for inclusion in the next round of the study (see Table 3).

4.2. Round 2

In Round 2, the questionnaires included 16 items in which 13 items were based on Round 1 and three others (“Research framework,” “Having research assistant (e.g., masters/PhD student)” and “Experience and knowledge in review answering” (items 14–16)) were added according to suggestions from the participants in Round 1. Personal emails were sent to all 35 participants who had participated in Round 1 to invite them to continue in Round 2. Since all the respondents were active researchers, it was possible they could be too busy to attend to the Round 2 invitation emails. Therefore, reminder emails were delivered to those who did not answer the Round 2 email survey invitation within two weeks. In total, we only obtained 20 acceptances for participation in Round 2, meaning that 15/35 (or 42.8%) respondents dropped out of our study after round 1. Drop out between rounds in studies using the Delphi method a natural phenomenon due to time constraints or lack interest on behalf of participants [48]. For instance, Clark [49] reported that in his Delphi study, 4/16 respondents dropped out between Round 1 and Round 3, which implied a dropout rate of 25%.

Table 2 lists the personal characteristics of the 20 experts who agreed to continue in Round 2. In Round 2, fifteen were male (75%) while the rest were female (5, 25%). The majority, as in Round 1, were still in the age categories of 31–35 years (8, 40%) and 36–40 years (7, 35%). The remaining age categories were 26–30 (3, 15%); 41–45 (1, 5%); and 46–50 (1, 5%). Half of the participants (10 people) in Round 2 held a PhD degree and the other half held a Masters’ degree. With regard to international publishing, 6 participants (30%) had published 1–2 papers, while 14 others (70%) had published 3 or more papers. However, 5 participants (25%) had never published a paper as first or corresponding author; the respective figures for 1–2 papers and 3 papers or above are 8 (40%) and 7 (35%). In terms of field of research, our 20 participants in Round 2 were divided into two equal groups of 10 each: STEM and SSH or others. In terms of experience in the academic sector, the group with 5–10 years’ experience still dominated, with 10 participants (50%). This was followed by the group with 10–15 years’ experience (4, 20%); over 15 years’ experience (4, 20%); and under 5 years’ experience (2, 10%).

The results of Round 2 are presented in Table 3. The results of Round 1 were all confirmed: 12 items (from 2 to 13) reached consensus, while one item (item 1) did not. For the three newly added items in round 2 (items 14–16), two items (item 14 and 16) reached consensus, with 80% of respondents answering “agree” or “strongly agree,” and one item (item 15) did not, with only 60% of respondents answering “agree” or “strongly agree.”

Thus, after two rounds of the Delphi survey, we explored 14 factors, corresponding to the 14 items that reached consensus in the questionnaires, which affect international publishing, according to our surveyed experts. These were: “Accessibility of international scientific documents”; “Research idea/topic”; “Input research data”; “Experimental devices or tools, software used for research purposes”; “Proficiency in foreign language reading of scientific documents”; “Proficiency in foreign language writing of scientific documents”; “Accessibility of research funding”; “Time available for research purposes”; “Data analysis capability”; “Collaboration with domestic peers”; “Collaboration with international peers”; “Selection of an appropriate journal for submission”; “Research framework”; and “Experience and knowledge in responding to reviewers”.

5. Discussion and Implications

International publishing has gained increasing attention in the Vietnamese academic community in recent years [1,15,20]. This is a result of the on-going higher education internationalization implemented by the Vietnamese government and universities [1,3]. Traditionally, universities in Vietnam mostly focused on teaching. Nowadays, they are highly aware of the importance of research, especially research of an international standard (i.e., in internationally indexed publications) as the foundation for their sustainable development. However, there is little understanding of the factors

influencing international publishing by academic staff in Vietnam. To address this issue, this study used the Delphi method to reach agreement among a panel of academic staff from different fields in Vietnam, who had experience in international publication. Thus, after two rounds of the survey, we found 14 factors that might lead to success in international publishing, according to the sampled respondents. These 14 factors were further regrouped into three clusters influencing international publishing by academic staff in Vietnam: “policy-related factors,” “capacity-related factors”, and “networking-related factors” (Figure 1). The name of each dimension reflects the attribute of their respective factors. For instance, the dimension of “capacity-related” refers to the factors pertaining to knowledge, skills and experiences of researchers in international publishing. Similar principles are also applied for naming of “policy-related” and “networking-related” dimensions. These three dimensions interact together to influence the success of international publishing.

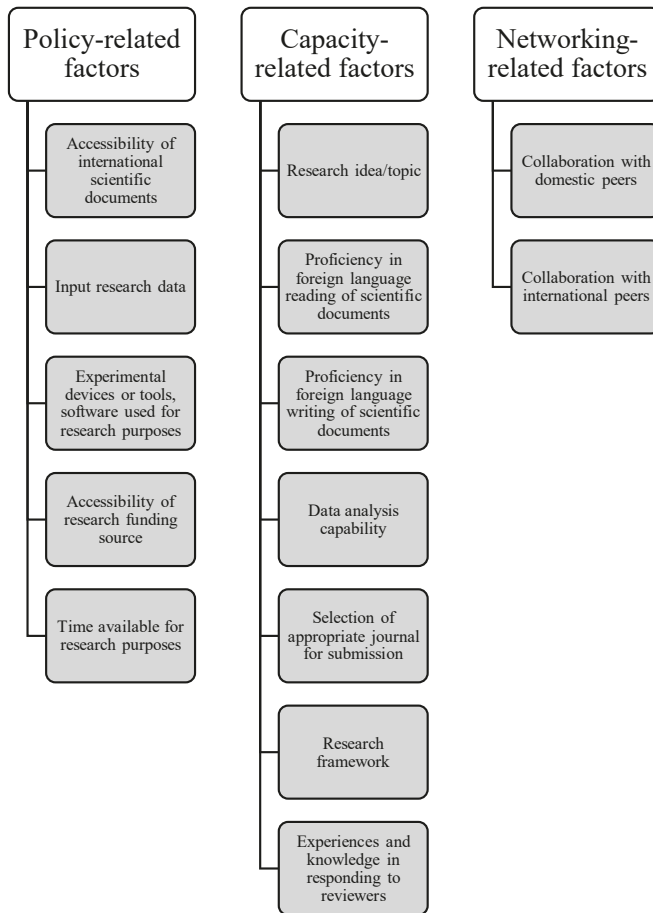


Figure 1. Factors impacting on international publishing of academic staff in Vietnam.

5.1. Policy-Related Factors

Prior literature has shown the importance of governmental as well as institutional policies in the research outcomes of faculty members [1,32]. Therefore, it is not surprising that our sampled panelists emphasized the role of “policy-related factors” in their success in international publishing,

including: “Accessibility of international scientific documents” (item 2); “Input research data” (item 4); “Experimental devices or tools, software used for research purposes” (item 5); “Accessibility of research funding” (item 8); “Time available for research purposes” (item 9).

“Accessibility of international scientific documents” gained the highest level of agreement among respondents, with scores of 100% in both rounds. Highlighting the importance of “accessibility in international scientific documents,” reflects a chronic shortage of referencing resources, which is common in developing countries [50]. Such a shortage also applies in Vietnam’s context: recent unofficial evidence indicates that only 10% of Vietnamese universities have digital libraries connecting to international academic databases such as ScienceDirect or Elsevier, confirming the issue mentioned above [51].

Nowadays, many scholars use secondary data for their research analysis (e.g., see [32]). Therefore, accessing research data is paramount [52,53]. Academic database providers often sell subscriptions to access secondary data resources, along with publication resources. Given this, the importance of “input research data” as perceived by our sample is obviously associated with the factor of “Accessibility of international scientific documents.”

“Experimental devices or tools, software for research purposes” is a crucial driver of international publishing, according to our findings. This is in line with several previous studies. For instance, Olmsted et al. [54] observed in the public health sector that “access to reliable laboratory testing remains limited in many resource-limited countries” (p. 374). Similarly, unauthorized use of academic software was identified as one of the most common forms of software piracy in developing countries, according to Zoheir and Mohammed [55].

Along with the shortage of “Experimental devices or tools, software for research purposes,” shortage of research funding (“Accessibility of research funding”) is another significant difficulty for Vietnamese researchers, as found in our survey. Available data shows that investment in R&D in Vietnam is relatively lower than in other countries in the region [19]. However, the absolute value of research funding is only part of the problem; the other part pertains to issues of transparency and fairness [56]. According to Vuong [15] and Tran et al. [57], NAFOSTED is an exceptional governmental funding source that is appreciated by the academic community in Vietnam thanks to its international standards in terms of operation. The others are often seen as highly bureaucratic, non-transparent, and even corrupt [58].

“Time available for research purposes” is the last factor under the dimension of “policy-related” [4]. In Vietnam, since most universities are teaching institutions, staff are often overwhelmed with teaching workloads and do not have enough time for research activities [56]. It is also worth noting that sabbatical leave, which is often used by faculty staff in developed countries as a time to focus on research, is uncommon in actual practice in the academic sector in Vietnam at present [59].

5.2. Capability-Related Factors

The “capability-related” dimension refers to the knowledge, skills and experience of scholars during different phases of research such as: identifying research ideas/topics and frameworks; literature reviewing, data analysis, manuscript writing, manuscript submission and responding to reviewers’ comments. These phases are consistent with the seven factors shown in Figure 1. “Research idea/topic,” “research framework,” and “data analysis capability” are the three essential drivers of quality research, according to previous studies [4].

Having an awareness of the importance of these above factors, curriculum designers in universities worldwide have placed research methods courses at the center of their Masterate and PhD programs with the aim of giving their early career researchers the necessary research knowledge and skills for a future academic career (see [60,61]). Since all our participants had experience publishing internationally, and many of them had graduated overseas, it is understandable that they all acknowledged the need for research knowledge and skills.

“Proficiency in foreign language reading of scientific documents” and “Proficiency in foreign language writing of scientific documents” are the two other factors that can be obstacles for Vietnamese scholars wanting to publish in international journals. These findings are in line with previous studies conducted in the Vietnamese context (e.g., [4,32,56]) and in other non-native English-speaking countries (e.g., [62]).

The two last factors in the “capability-related” dimension are “Selection of appropriate journal for submission” and “Experience and knowledge in responding to reviewers.” While the former is consistent with Pho and Tran’s finding [4], which also selected Vietnamese scholars as respondents, the latter is not. It might be because our respondents were at the ‘expert’ level as required by the Delphi method; thus, they had more experience in research publishing and were more aware of the obstacles during the reviewing process.

5.3. Networking-Related Factors

“Networking-related” is the last dimension relating to success in international publication of research. The dimension is composed of two factors: “Collaboration with domestic peers” and “Collaboration with international peers.” Previous studies also assessed the impacts of these two factors on scholars’ publication outcomes. For instance, Vuong et al. [63], using data from Scopus between 2008 and 2017, found that 90% of Vietnamese social scientists collaborated with colleagues to publish. Vuong and his colleagues also found that collaboration with domestic and international colleagues enhanced researchers’ productivity [3]. A later study also conducted by Vuong and his research team (see [64]) further strengthened and expanded the above finding. Specifically, these authors asserted that in order to “reach and maintain high productivity levels”, a research community must satisfy four criteria: (i) a stable co-authorship network, (ii) support from foreign colleagues in the field, (iii) outstanding research leaders, and (iv) a sustainable inflow of new researchers” (p.77). All of these four criteria are relevant to the “networking-related factors” in our study.

5.4. Factors That Did Not Reach Consensus

There were two factors that did not reach consensus among our panelists. These were: “Accessibility of domestic scientific documents” and “Having a research assistant (e.g., masters/PhD student).” Since the purpose here is to publish internationally, the rejection of the former factor (“Accessibility of domestic scientific documents”) is understandable. However, the rejection of the latter factor is somewhat surprising, and it is not consistent with previous studies. For instance, Larivière [65] noted that PhD students in Canada are part of their supervisors’ research groups (along with other members such as post-doc fellows or technical officers), contributing to the overall performance of the group. Specifically, Larivière’s findings [65] indicated that between 2000-2007, PhD students co-authored 33% of the total publications in Quebec province, Canada. Our contradictory finding can be explained by consideration of the particular context of the Vietnamese research landscape. We propose some plausible explanations, as follows. First, Vietnamese scholars have experienced having poorly qualified graduate students. As one of the most significant sources of international students in Asia, many young Vietnamese go abroad every year to undertake degree studies [66]. Many of these are talented and have scholarships to study in developed countries. Consequently, those who stay home to pursue graduate education are under-qualified compared to the expectations of our scholar panelists. Thus, professors and senior lecturers in Vietnam tend not to regard PhD and Masterate students as essential factors in their research teams. Second, another possible interpretation is because Vietnam lacks appropriate policies to support PhD students: the majority of PhD students in Vietnam are self-funded and studying part-time while also working to support themselves, meaning that they may not be able to concentrate fully on their research. Given these circumstances, it is understandable that senior scholars in Vietnam are not willing to collaborate with their PhD students in international publishing.

6. Conclusions, Implications, and Limitations

International publishing is playing an increasing role in the internationalization of higher education and research systems in Vietnam. At present, the “absolute” performance in terms of international publishing by Vietnamese researchers is still modest. However, when examining the growth trend, Vietnam performs better than many other countries in the region [23]. Given this circumstance, the aim of this study was to explore the key factors that create success for Vietnamese scholars in international publishing (i.e., articles published in journals/books indexed by ISI Web of Science/Scopus databases). Using a Delphi approach to collect opinions from a panel of scholars, this study found 14 factors that affect international publishing by Vietnamese academics. These 14 factors are further classified into three dimensions: “policy-related factors,” “capability-related factors,” and “networking-related factors.”

The findings of this study provide implications for a range of stakeholders. Specifically, they may act as inputs for further adjustment in terms of policy, incentives, and regulations at both national and institutional levels.

First, the Vietnamese government and universities should invest more profoundly in e-resources, to enable their academic staff to access international scientific documents, data, and software for research purposes. To do this, some “best practices” learned from the US’s information and library services consortiums should be taken into consideration. For instance, the South Carolina Information and Library Services Consortium, shared among 11 public two-year Colleges in South Carolina, which was initiated in 1995, has shown multiple benefits for users, such as a union online catalog, sharing of financial resources, expertise, and learning opportunities [67].

Second, apart from e-resources, the current management of tangible resources, such as experimental devices and tools or laboratory facilities, needs to be overhauled. Currently, at the national level, tangible resources for research are under the auspices of the Ministry of Planning and Investment, which is separated from research grants, which are overseen by the Ministry of Science and Technology. A further adjustment that unifies the national management of tangible research resources and research grants into a single governing body would enhance the effectiveness and efficiency of research funding in Vietnam.

Third, apart from the unification mentioned above, further policies relating to research grants in Vietnam should emphasize international publication as a mandatory output of nationally funded research projects. At present, NAFOSTED is the only research funder in Vietnam that has such a requirement.

Fourth, further policies at both national and institutional levels need to be adjusted in order to create favorable conditions and enhance researchers’ capability. For example, sabbatical leave should be adopted in order to enhance “time for research” for Vietnamese scholars.

In addition, short-term fellowship programs, which encourage faculty mobility both domestically and internationally, would be a measure to simultaneously address the multiple factors included in the “capacity-related” and “networking-related” dimensions, as shown in Figure 1. To date, the Vietnamese government seems to have over-emphasized scholarship programs to send young faculty to study for PhDs abroad, but neglected post-doc fellowship programs to nurture scholars at that level.

Furthermore, the current curricula of masters and doctoral programs in Vietnam should be reformed with more credits assigned to research method courses. This would be an appropriate measure that would result in capability building for the next generation of scientists in Vietnam.

Fifth, further policies should be adjusted in order to promote closer co-operation between senior scholars and their Masterate and PhD students. This is particularly crucial for the sustainable development of the academic sector, as indicated in several previous studies [65,68]. For example, universities and research institutions in Vietnam might include the number of co-publications (between professors/senior lecturers) as criteria for periodic evaluation and promotion of their senior scholars. Another intervention could be a requirement that research funding agencies demand that their grantees involve Masterate and PhD students as official members of the research project.

All studies have their own limitations, and this is no exception. First, prior studies in related areas in Vietnam have revealed that there may be several differences in terms of research outputs/behaviors stemming from different groups of authors. For instance, Doan et al. [69] found that male social scientists in Vietnam tend to have higher productivity than their female peers. Due to the small data sample, our study could not reconfirm this finding. Future researchers may be able to investigate to what extent productivity differs in other groups of participants, according to their gender, or other attributes such as fields of research (e.g., Science, Technology, Engineering and Mathematics (STEM) vs. non-STEM), age, or type of institutions.

A second limitation lies in our participant sample. Specifically, as shown in Table 2, 10/35 respondents in Round 1 and 5/20 respondents in Round 2 had never had an international publication as first or corresponding author. To that extent, they were not really “experts” as required by the Delphi Method and as benchmarked with standards from developed academic systems. This was due to the difficulties we experienced in approaching high-performing experts, who were prepared to commit to spending the necessary time to complete both Rounds of our study. Further study, also using the Delphi method, is recommended to take this issue into consideration.

A third limitation of this study pertains to the nature of the Delphi method. While the Delphi method helped to explore the factors impacting international publishing, it could not estimate the relative importance of these factors. For example, the work of Vuong et al. [3] revealed that in Vietnam, social scholars affiliated with universities outperform their peers affiliated with research institutes/centers. In this study, due to the nature of the Delphi method, we could not find empirical evidence to verify this finding. In the light of this, further studies might adopt other approaches such as an Analytical Hierarchy Process (AHP) (see [70]) or a Structural Equation Model (SEM) (see [71]) in order to quantify the relative weights of different factors as predictors of international publishing as perceived by Vietnamese scholars. Practical implications drawn from the quantitative findings of a study using AHP or SEM would possibly be more insightful than those using non-parametric approaches, as used in this study.

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Article

Sociocultural Adaptation Profiles of Ethnic Minority Senior High School Students in Mainland China: A Latent Class Analysis

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Abstract: This study aimed to quantitatively determine the sociocultural adaptation profiles of ethnic minority senior high school students in mainland China. A large-scale questionnaire survey of 1873 Grade 12 students from 31 interior ethnic boarding schools throughout China was conducted. Through exploratory and confirmatory factor analyses, the underlying structure of the sociocultural adaptation questionnaire was uncovered as consisting of three domains and six factors: General adaptation (daily life and school management), academic adaption (learning strategies and learning self-efficacy), and interaction adaptation (interethnic contact and cultural identity). By performing latent class analysis, four distinct sociocultural adaptation profiles of students were distinguished: The well-adapted group (28.0%), the general adaptation group (31.0%), the interaction adaptation group (24.4%), and the maladaptation group (16.6%). The results of chi-squared and variance analyses showed that the sociocultural adaptation profiles of ethnic minority senior high school students were significantly related to sociodemographic variables, such as ethnicity, class organization, hometown location, and family socioeconomic status. These profiles can be used to evaluate changes in ethnic minority students' sociocultural adaptation and will contribute to the perfection of the ethnic minority boarding school system and the ultimate realization of inclusive and equitable quality education in China.

Keywords: interior ethnic boarding school; inclusive and equitable quality education; sociocultural adaptation; latent class analysis

1. Introduction

The Education 2030 agenda, as a global programmatic document on education for sustainable development, focuses on inclusion and equity [1]. Everyone, especially disadvantaged groups such as people with disabilities, immigrants, indigenous people, and ethnic minorities, should have the opportunity to receive equal, quality education and the chance of lifelong learning.

There is no lack of empirical evidence highlighting the difficulties encountered by minority students in the education system worldwide [2–5]. Compared with mainstream students, ethnic minority students often have lower academic achievement and weaker employment competitiveness [6]. To realize the equitable quality education goal, various policies and governmental strategies have been designed to enable students of different ethnicities and social class backgrounds to have the opportunity to receive equitable quality education. As a result, the study performance and employment competitiveness of all students have improved. China's ethnic minority boarding school system provides access to quality education to students from border ethnic areas.

China is a multiethnic country with 55 state-defined minority groups. Most ethnic minorities live in Chinese underdeveloped border areas where the economic conditions and educational foundation

lag far behind the interior contemporary societies. In order to narrow the educational gap between ethnic minority areas and interior developed areas and to allow ethnic minority students in border agricultural and pastoral areas to enjoy quality education resources, since 1985, the Chinese government has funded minority middle and high school students from communities in Tibet to study at interior ethnic boarding schools thousands of kilometers away [7–11]. Modeled closely after this program, minority high school students from Xinjiang have also been funded to study at such boarding schools since 2000 [12–15]. Most of these schools, located in eastern and coastal cities of China, are supplied with the best educational resources and the most professional teachers. Minority students are selected to study in such boarding schools according to voluntary registration and examination admission. These boarding schools have always gained positive recognition from minority students and their parents, and as a result the scale of enrollment has expanded annually. A cumulative total of more than 250,000 students have been enrolled and nearly 100,000 college graduates have returned to Tibet and Xinjiang and become prominent members of their communities in all walks of life.

Interior ethnic boarding schooling has a strong cross-cultural education nature. Most of the ethnic minority students grew up in frontier minority regions with distinct cultural heritages. After coming to the interior and coastal cities with the dominant Han culture, it can be a real challenge for young ethnic minority students to fit into the new and radically different culture. They are faced with various difficulties in ways of life, natural environment, language, learning, psychology, and interpersonal communication. These students are far away from their families and local communities at the minimum age of about 12 years old, which is a critical period of forming their personality and values. Their capacity to adapt well to the dominant culture will directly affect their mental health, learning effect, views on their study experience, as well as the quality and effect of this unique schooling system. Therefore, it is very necessary to evaluate ethnic minority students studying under the dominant national culture by employing concepts from the research field of sociocultural adaptation, as this is key to promoting their mental health and improving the effectiveness of their education.

2. Literature Review

2.1. Studies on Cross-Cultural Adaptation

Cross-cultural adaptation refers to “the dynamic process by which individuals, upon relocating to new, unfamiliar, or changed cultural environments, establish (or reestablish) and maintain relatively stable, reciprocal, and functional relationships with those environments” [16]. Long-term immigrants [17–19] and temporary sojourners to different countries [20–24] have always been the focus of cross-cultural adaptation research. However, due to the differences between minority heritage cultures and the dominant national culture, ethnic minority populations also have to adapt to the host society in which they were born or raised. Therefore, the research object of cross-cultural adaptation has gradually expanded to ethnic minority groups within a society, such as American Indians in Oklahoma [25], Tibetans in China [26], ethnic minorities in Hong Kong [27], and so forth. However, adults may elect to limit their contact with individuals from different cultural backgrounds, while ethnic minority youths who study in the mainstream school environment have less control over their exposure to the dominant culture [28]. In addition, ethnic minority youths are at a critical stage of forming their values and ethnic identities; therefore, except for academic achievement, the cross-cultural adaptation of ethnic minority youths in multiethnic schools has gradually attracted the attention of scholars [28–31].

A number of different models of cross-cultural adaptation have been proposed [28,32], and one of the most widely accepted is that developed by Ward et al. [33]. They maintain that cross-cultural adaptation may be meaningfully divided into psychological (emotional/affective) and sociocultural (behavioral) adaptation dimensions. The former refers to feelings of well-being and satisfaction, whereas the latter refers to the ability to “fit in” or negotiate interactive aspects of the host culture. Studies have shown that the better the sociocultural adaptation, the better the psychological adaptation [34].

2.2. Studies on Measurement of Sociocultural Adaptation

As one of the two major dimensions of the cross-cultural adaptation process, sociocultural adaptation has been repeatedly measured in many studies. For example, Furnham and Bochner (1983) proposed that the presence of social situations in the local environment that are not found in the culture of the sojourner results in difficulties and adaptation problems [35]. So, the Social Situations Questionnaire (SSQ) was developed to assess the difficulties and problems experienced by sojourners in daily social contact with local people. A widely used measurement of sociocultural adaptation, also the one adopted in this study, is the Sociocultural Adaptation Scale (SCAS) [36]. SCAS is a behavioral and cognitive measure developed to assess the difficulties encountered in a certain situation. Most of the items are applicable to different groups, so an advantage of the SCAS lies in its flexibility and modifiability to suit the needs of different samples. Based on the SCAS, some scholars have identified different domains of sociocultural adaptation, such as in the management field, in which the construct of sociocultural adaptation was divided into general, work, and interaction adaptation domains [37]. For overseas or ethnic minority students, work adaptation may be replaced by academic adaptation.

Variations in adaptation experiences have also gained scholarly attention. The adaptation classification of participants has often been created according to the scale scores, the scalar midpoint, or the median score, or the highest score may be selected as the cutoff criterion [38]. However, these traditional methods of dividing scores are not uniform and therefore subjective, so the comparison of classification results between different studies is almost impossible. To avoid the subjectivity of classification, latent class analysis (LCA) has been increasingly performed to explore variations in cross-cultural adaptation experiences and to identify different adaptation classes [39–41]. LCA is a technique used to classify observations based on patterns of categorical responses. This approach is characterized by the absence of a predetermined classification number, which avoids the subjectivity of other cluster methods such as K-means and has been widely applied to the potential heterogeneity of research groups for psychological, emotional, and behavioral diagnosis [42–45].

2.3. Studies on the Sociocultural Adaptation of Ethnic Minority Students in China

In recent years, related studies of interior ethnic boarding schooling have attracted an increasing amount of attention from Chinese and international scholars. The background, aims, history, operating mechanism, and social effects of these special schools have been explored [7–15,46]. From the frontier to the interior, ethnic minority students have to face the huge cultural differences that characterize the strong cross-cultural education nature of interior ethnic boarding schooling with; so, the sociocultural adaptation of these students has become a research hot spot [47–52]. The challenges that ethnic minority students face in the process of sociocultural adaptation and the factors that affect their adaptation have been considered in thorough research.

However, these previous works tend to be descriptive case studies. As far as we know, no probability sampling-based quantitative empirical research has been conducted to identify distinct classifications of these ethnic minority students based on differences in their responses on the sociocultural adaptation indicators. Thus, the purposes of this study were as follows:

1. Identify the sociocultural adaptation classes of ethnic minority senior high school students, and
2. determine the sociodemographic characterizing elements for every class.

3. Materials and Methods

3.1. Study Site

There are mainly two kinds of interior ethnic boarding schools according to where the students come from: One is called the Tibet class, where minority students are from Tibet, and the other is called the Xinjiang class, where minority students are all from Xinjiang. This research only focused on

the Xinjiang class, but the research method is also applicable to a follow-up study on sociocultural adaptation of ethnic minority students from the Tibet class.

Xinjiang, located in China's northwest frontier, is a multiethnic region in China. According to the latest Chinese national census, 13 ethnic nationalities constitute nearly 60% of Xinjiang's total population, among which Uyghur is the largest ethnic group, who compose 45.8% (approximately 10,001,302 people) of the population. As a means of intellectual aid to Xinjiang, the Xinjiang class was established starting in 2000. In the 19 years from 2000 to 2019, the Xinjiang class experienced 11 large-scale enrollment expansions, and annual student enrollments expanded from 1000 students at the beginning to more than 9000 students. There are currently a cumulative total of more than 100,000 students enrolled in the Xinjiang class and more than 34,800 at-school students in 93 senior high schools located across 45 cities throughout China (see Figure 1).

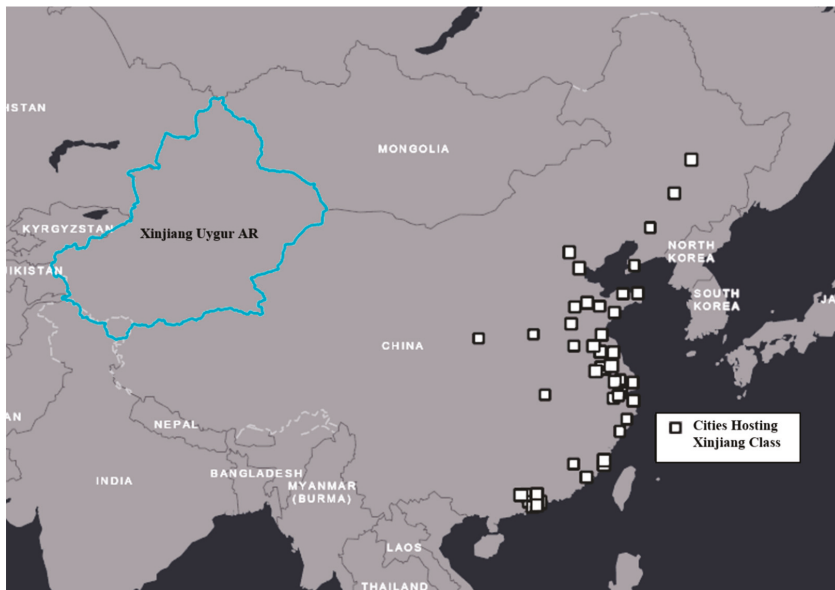


Figure 1. Location of Xinjiang classes.

3.2. Participants

There are 93 senior high schools across 14 provinces and municipalities running Xinjiang classes. In each province and municipality, schools were randomly selected using a ratio of 1:3 for a total of 31 schools. Grade 12 students of Xinjiang classes in each school were selected as participants. As the final grade of the Xinjiang class, they have studied and lived in China's interior regions for three years (including a year of preparatory study), so it is more representative to test their sociocultural adaptation in China's interior regions.

An online questionnaire system was designed by the researchers and each school was responsible for organizing their students to participate in the survey. The respondents completed the questionnaire anonymously and they were told that the results were only for academic research and their teachers could not see their choices. In total, 1873 student questionnaires were collected online (see Table 1). Participants consisted of 664 boys (35.5%) and 1209 girls (64.5%), the percentage of girls was almost two times higher than the percentage of boys, which is due to the enrollment being based on the academic performance of the Xinjiang class' admission examinations, and girls generally perform better than boys at this stage. As for hometown location, 33.5% of students were from urban regions and most of the students (66.5%) were from rural regions. Most of the participants reported that they

are Uyghur (62.4%), followed by Han (14.4%), Kazak (9.7%), Hui (8.6%), other nationalities (4.9%). The high percentage of rural and Uyghur students was due to the enrollment policy of the Xinjiang class, which stipulates that 80% of the students should be from the rural and nomadic regions of southern Xinjiang, where 90% of Uyghurs live. As for the class organization, 51.9% of the participants were in the divided class, which means the ethnic minority students and local students studied in separate classrooms in the same school, and 48.1% of the participants were in the mixed class, which means the ethnic minority students and local students study in the same classrooms.

Table 1. Demographic information of samples (N = 1873).

	Frequency (N)	Percentage (%)
Gender		
Boys	664	35.5
Girls	1209	64.5
Hometown Location		
Urban	628	33.5
Rural	1245	66.5
Ethnicity		
Uyghur	1169	62.4
Han	270	14.4
Kazak	182	9.7
Hui	161	8.6
Other	91	4.9
Class Organization		
Mixed Class	901	48.1
Divided Class	972	51.9

3.3. Instrument

The sociocultural adaptation questionnaire consisted of two major sections: Personal demographic information and a composite scale that measured sociocultural adaptation.

Personal Demographic Information. This included gender, ethnicity, hometown location, class organization, parents' careers, parents' education, and family assets.

Sociocultural Adaptation. The SCAS, developed by Ward et al. [36], has proved to be a flexible and modifiable instrument to suit the needs of different samples. Using the original items of the SCAS as a foundation, a Chinese version of the scale has been designed to probe the three domains of general adaptation (managing daily life), academic adaptation (accomplishment of study-related objectives), and interaction adaptation (relating effectively to host nationals). The validity and reliability of this scale have been validated in the Chinese student context [51–55]. For the study of ethnic minority students in China, general adaptation was further divided into daily life and school management adaptation dimensions, academic adaptation was further divided into learning strategies and learning self-efficacy dimensions, and interaction adaptation was further divided into interethnic contact and cultural identity dimensions [51–53]. The final scale contains 24 items in total and each dimension includes four items. The specific descriptions of each dimension are shown in Table 2.

Table 2. Specific descriptions of each dimension in the sociocultural adaptation questionnaire.

Dimension	Description	Example Item
Daily life	Daily life related to local food, weather, etc.	Getting used to the local food
School management	Rules used to regulate the behavior of students in the school	Following rules and regulations in school
Learning strategies	Behaviors and techniques students adopt in learning activities	Expressing your ideas in class
Learning self-efficacy	Students' confidence that they can complete a learning task	Being confident that you can do well in the courses
Interethnic contact	Communication between people of different ethnic groups	Making friends with local Han students
Cultural identity	Identification with local culture	Taking a local perspective of the culture

3.4. Data Analysis

3.4.1. Factor Analysis

Factor analysis was performed to examine the construct validity of the sociocultural adaptation questionnaire. First, exploratory factor analysis (EFA) was conducted to identify the latent structure of items in the questionnaire. Principal component analysis with a varimax rotation was used to extract the factors. The number of retained factors was determined by combining an eigenvalue greater than one and the scree plot criteria. The items were retained based on the criteria that the factor loading of each item was above 0.4 and the communality of items was above 0.3. Then, confirmatory factor analysis (CFA) was conducted to verify whether the structure obtained by EFA had a good enough fit. Several fitting indexes should be reported and the conventions are that χ^2/df should be around 1, the root mean square error of approximation (RMSEA) should be below 0.05, and the comparative fit index (CFI) and tucker-lewis index (TLI) more than 0.9 [56]. All factor analyses were performed in Mplus 5.21 [57].

3.4.2. Latent Class Analysis

LCA was performed to explore variations in sociocultural adaptation experiences and identify distinct adaptation classes of ethnic minority students based on similar patterns of scores on the sociocultural adaptation factors. LCA is a statistical technique that identifies the presence of unobservable subgroups (latent classes) within a population using patterns of association among observed variables [58]. This probability-model-based classification method can ensure both the maximum difference between the classified classes and the minimum difference within the classes. Further, LCA performs better than other clustering methods such as K-means, as the former provides the fit statistics (e.g., Akaike Information Criterion (AIC), Bayesian Information Criterion (BIC), and sample-size adjusted BIC (aBIC)) to measure the accuracy and effectiveness of classification, whereas in other clustering methods, determining the optimal number of classes is an arbitrary decision [59]. By using LCA, distinct sociocultural adaptation classes could be identified and various dimensions in participants' sociocultural adaptation experiences could be captured. LCA was done in Mplus 5.21.

3.4.3. Significance Test of Difference

To examine the characterizing elements for each sociocultural adaptation class, ANOVA and χ^2 tests were used to investigate the differences between students with different sociocultural adaptation classes on sociodemographic variables. The significance test of difference was performed in SPSS 20 [60].

4. Results

4.1. Validation of the Sociocultural Adaptation Questionnaire

EFA was performed on randomly selected subsets ($n = 936$) to examine the latent structure of the sociocultural adaptation questionnaire. Six factors were extracted by principal component factor analysis and these factors accounted for 58.92% of the variance. As shown in Table 3, the factor loading of each item was greater than 0.4 for the relevant factor and all 24 items were retained. Further, the Cronbach's α coefficient for each of the six identified factors was around 0.72–0.84 and the overall Cronbach's α coefficient was 0.89, suggesting the good reliability of the questionnaire in mainland China.

Table 3. Exploratory factor analysis (EFA) results and reliability of the sociocultural adaptation questionnaire.

Item No.	Factor Loading					
	School Management	Daily Life	Learning Self-Efficacy	Learning Strategies	Interethnic Contact	Cultural Identity
1	0.686					
2	0.645					
3	0.597					
4	0.589					
5		0.761				
6		0.756				
7		0.729				
8		0.717				
9			0.722			
10			0.707			
11			0.688			
12			0.686			
13				0.761		
14				0.661		
15				0.667		
16				0.666		
17					0.851	
18					0.824	
19					0.675	
20					0.637	
21						0.773
22						0.730
23						0.677
24						0.665
Cronbach's α	0.722	0.832	0.780	0.796	0.734	0.787

CFA was performed on the other subsets ($n = 937$) to verify whether the structure obtained by EFA had a good enough fit. The fitting degree analysis results of the structural equation model are listed in Table 4, which clearly show that the questionnaire has good validity in mainland China, as the fitting index values were all within the acceptable ranges.

Table 4. Confirmatory factor analysis (CFA) results for the sociocultural adaptation questionnaire.

Fitting Index	χ^2	p	χ^2/df	RMSEA	CFI	TLI
Value	3736.5	<0.001	1.996	0.033	0.967	0.962

Correlation analysis was performed on the full sample to examine correlations between the six identified factors. As shown in Table 5, all six factors were significantly correlated with each other; in

particular, school management was highly correlated with daily life, learning self-efficacy, and learning strategies. Further, learning self-efficacy was highly correlated with learning strategies ($r > 0.4$).

Table 5. Results of the correlation analysis.

Factors	School Management	Daily Life	Learning Self-Efficacy	Learning Strategies	Interethnic Contact	Cultural Identity
School Management	1					
Daily Life	0.475 **	1				
Learning Self-efficacy	0.419 **	0.242 **	1			
Learning Strategies	0.408 **	0.235 **	0.534 **	1		
Interethnic Contact	0.204 **	0.078 **	0.153 **	0.175 **	1	
Cultural Identity	0.211 **	0.132 **	0.169 **	0.205 **	0.283 **	1

Note: ** $p < 0.01$.

4.2. Students' Sociocultural Adaptation Profiles

LCA was performed to investigate whether the ethnic minority students can be assigned to different sociocultural adaptation classes based on similar patterns of scores on the sociocultural adaptation factors. To identify the optimal number of sociocultural adaptation classes, LCA was performed separately for the sociocultural adaptation of students with one to six classes. The fitting indices of these six models are shown in Table 6. Among the four fitting indicators, the lower the values of AIC, BIC, and aBIC, the better the model fit, while some scholars have pointed out that the BIC should be given greater weight among these indices [61]. As a result, a model with four classes fits best. In addition, entropy represents a model's ability to achieve correct classification, and the higher the value, the better the model fit. Entropy for the four classes was 0.895, suggesting the sound classification ability of four classes. Therefore, four classes were chosen as the optimal sociocultural adaptation classes.

Table 6. Comparison of fitting indices of six models.

Model	AIC	BIC	aBIC	Entropy
1	146,928.1	147,741.8	147,274.8	—
2	136,960.5	138,593.4	137,656.2	0.823
3	134,333.6	136,785.8	135,378.3	0.867
4	132,566.2	135,337.5	132,559.9	0.895
5	131,333.3	135,523.9	133,076.1	0.895
6	130,460.6	135,470.4	132,752.5	0.895

After determining the optimal number of sociocultural adaptation classes, the last step was to assign each student to the appropriate latent class through model assignment; that is, students were assigned to the sociocultural adaptation class to which they had the highest probability of belonging. Then, to further validate the four-class solution, ANOVAs were performed to investigate whether students belonging to different profiles differed on the previously identified six factors of sociocultural adaptation. The results in Table 7 show that the differences between students from different profiles were significant. There were large effects for school management ($F(3, 1873) = 459.64, p < 0.001, \eta_p^2 = 0.43$), daily life ($F(3, 1873) = 532.12, p < 0.001, \eta_p^2 = 0.46$), learning self-efficacy ($F(3, 1873) = 287.01, p < 0.001, \eta_p^2 = 0.32$), learning strategies ($F(3, 1873) = 268.77, p < 0.001, \eta_p^2 = 0.30$), interethnic contact ($F(3, 1873) = 167.22, p < 0.001, \eta_p^2 = 0.21$), and cultural identity ($F(3, 1873) = 379.39, p < 0.001, \eta_p^2 = 0.37$). Multiple comparison tests showed that the differences between the four profiles were significant on school management, learning self-efficacy, and learning strategies (all $ps < 0.001$). On daily life, students in the third and fourth classes were not significantly different ($p = 0.361$), but they were significantly different from the first and second classes (all $ps < 0.001$). On interethnic contact and cultural identity, students in the first and third classes were not

significantly different ($p = 0.091$ and $p = 1.00$), but they were significantly different from the second and fourth classes (all $ps < 0.001$). Figure 2 more intuitively shows the results.

Table 7. Mean standardized scores on the six factors in each class and ANOVA results.

Factors	Sociocultural Adaptation Profiles				Sig. diff.
	1	2	3	4	
School Management (z)	0.87	0.08	−0.43	−0.99	1 > 2 > 3 > 4
Daily Life (z)	0.84	0.25	−0.81	−0.71	1 > 2 > 3,4
Learning Self-efficacy (z)	0.78	−0.01	−0.31	−0.85	1 > 2 > 3 > 4
Learning Strategies (z)	0.76	−0.05	−0.23	−0.86	1 > 2 > 3 > 4
Interethnic Contact (z)	0.42	−0.27	0.41	−0.77	1,3 > 2 > 4
Cultural Identity (z)	0.38	−0.05	0.28	−0.94	1,3 > 2 > 4

Note: Mean standardized score, also called mean z-score, represents the relative position of an original score in a group. For example, 0.87 here is the average z-score of the students belonging to the first profile on the school management factor (consisting of four items).

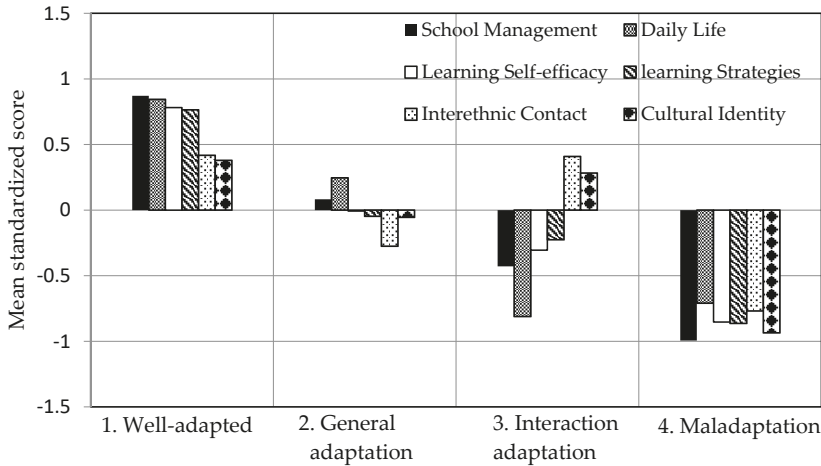


Figure 2. Visual representations of mean standardized scores on the six factors in each class.

The resulting students’ sociocultural adaptation profiles were interpreted as follows. Students in the first class (28.0%) scored highest on all sociocultural adaptation measures, so we called them the well-adapted group. The biggest group of students (31.0%) formed the second class. These students scored quite close to average on the academic domains (consisting of learning self-efficacy and learning strategies factors), while having relatively high scores on the general adaptation domains (consisting of school management and daily life factors) and slightly low scores on the interaction adaptation domains (consisting of interethnic contact and cultural identity factors), so they were labeled as the general adaptation group. Students in the third latent class (24.4%) were named the interaction adaptation group. On four factors measuring the general and academic adaptation, these students scored below average, but they scored relatively high on the two factors measuring interaction adaptation. Finally, the students belonging to the fourth latent class (16.6%) were named the maladaptation group, as they scored far below average on all measures.

4.3. Student’ Demographic Factors and Sociocultural Adaptation Profiles

ANOVA and χ^2 tests were used to investigate which sociodemographic variables were related to the students’ attribution to one of the latent classes. The results in Table 8 show that the sociocultural adaptation profile was not significantly related to the students’ gender ($\chi^2(3, 1873) = 5.78, p = 0.123$),

but it was significantly related to the students' class organization ($\chi^2(3,1873) = 3.27, p = 0.004$). Students belonging to the profile of well-adapted (53.4%) were more in mixed classes than the profiles of general adaptation (47.7%), interaction adaptation (45%), and maladaptation (46%). The sociocultural adaptation profile was also significantly related to the students' hometown location ($\chi^2(3,1873) = 17.56, p < 0.001$), with proportionally more urban students belonged to the profile of well-adapted (37.6%) and interaction adaptation (38.3%) than general adaptation (28.3%) and maladaptation (29.6%). The students' ethnicity revealed significant differences between their sociocultural adaptation profiles ($\chi^2(3,1873) = 13.26, p < 0.001$), with proportionally more Uyghur students belonging to the profile of maladaptation (70.4%) than the profiles of well-adapted (58.4%), general adaptation (61.7%), and interaction adaptation (59.7%). Students belonging to the profile of interaction adaptation ($M = 0.42, SD = 2.98; F(3,1873) = 6.47, p < 0.001$) had significantly higher family socioeconomic status (SES) than students belonging to the profile of well-adapted ($M = 0.02, SD = 2.98$), general adaptation ($M = -0.17, SD = 2.75$), and maladaptation ($M = -0.45, SD = 2.73$), and students belonging to the profile of well-adapted had significantly higher family SES than those belonging to the profile of maladaptation.

Table 8. Information on demographic variables for students in the four latent classes.

Variables	Sociocultural Adaptation Profiles				Sig. Diff.
	1. Well-Adapted	2. General Adaptation	3. Interaction Adaptation	4. Maladaptation	
Gender (% boy)	35.7	32.3	39.4	35.0	n.s. ¹
Class organization (% mixed class)	53.4	47.7	45.0	46.0	1 > 2, 3, 4
Hometown location (% urban)	37.6	28.3	38.3	29.6	1,3 > 2, 4
Ethnicity (% Uyghur)	58.4	61.7	59.7	70.4	4 > 1, 2, 3
SES ² (means)	0.02	-0.17	0.42	-0.45	3 > 1 > 4, 3 > 2

Note: 1. n.s. means not significant. 2. SES index consists of parents' careers, education, and family assets.

5. Discussion and Implications

By collecting questionnaires from 1873 ethnic minority senior high school students throughout mainland China, the current study presents a primary investigation of the sociocultural adaptation of these ethnic minority students. The sociocultural adaptation profiles of the students and the sociodemographic characterizing elements for every profile have been identified. On this basis, several recommendations for the sustainable development of the interior ethnic boarding school system are proposed.

5.1. Prevalence of Sociocultural Adaptation Difficulties

A widely used questionnaire (SCAS) in the field of sociocultural adaptation was used and the validation of the questionnaire was examined by EFA and CFA. As a result, six underlying factors of the questionnaire were extracted. Then, four distinct latent classes to which individual students belonged were determined by performing LCA. The results showed that 28.0% of the students belonged to the profile of well-adapted. These students had the highest scores on all sociocultural adaptation measures. As the name indicates, students belonging to this profile were well adapted to the general life, academic learning, and social interaction in China's interior regions.

Except for the students belong to the well-adapted profile, other students showed different aspects and degrees of sociocultural adaptation difficulties. About 31.0% of the students belonged to the general adaptation profile, as they reported to have positive adaptation regarding general daily life, rules, and regulations in the boarding school but poor adaptation regarding effective contact with the host nationals. That is, they are more in line with functional adaptation rather than cultural-identity-related adaptation.

In contrast, the third profile, which consisted of 24.4% of the students, reported a completely different adaptation profile and was therefore named the interaction adaptation profile. They reported to have positive adaptation only regarding effective contact with the host nationals but poor adaptation regarding general daily life, rules, regulations, and academic learning in the boarding school. That is, they are perhaps better at adapting their identity in multiethnic classrooms rather than academic or functional adaptation.

Finally, 16.6% of the students belonged to the profile of maladaptation. These students scored far below average on all measures, which reflects that these students face great difficulties and challenges in the sociocultural adaptation process.

Considering that the participants of this research were all Grade 12 students, as the final grade of the Xinjiang class, they have studied and lived in China's interior regions for three years (including a year of preparatory study), so the results showed the prevalence of sociocultural adaptation difficulties of ethnic minority students. The results are also supported by similar findings from prior studies [48–53]. The differences are that the prior studies were not able to identify distinct sociocultural adaptation classes and capture various dimensions in students' sociocultural adaptation experiences. Of course, the specific information about the proportion and characteristics of different adaptation groups is even less available.

5.2. Sociodemographic Factors Associated with Sociocultural Adaptation Profile

Sociodemographic data, such as gender, ethnicity, class organization, hometown location, and family SES, were selected to examine the association with the sociocultural adaptation profile by using ANOVA and χ^2 -difference tests. We found that there was no significant relation between gender and sociocultural adaptation profile. There is currently no consistent research conclusion on the effect of gender on sociocultural adaptation. This may be related to the individual's cultural background, which may have different requirements for boys and girls. However, there was a significant relationship between ethnicity and sociocultural adaptation profiles, with proportionally more Uyghurs in the maladaptation group than other profiles. This finding reflects the influence of cultural distance on sociocultural adaptation. Cultural distance between host and guest groups has always been regarded as the key factor of sociocultural adaptation [34,62]. The cultural distance between Uyghur and Han nationalities (the main nationality of China) is fairly large, as the former is rooted in a traditional nomadic culture while the latter is in a traditional sedentary farming culture. The two have great differences in ways of life, natural environment and climate, language, national psychology, interpersonal communication, recreational activities, family structure, religious culture, and so on. So, it would be a real challenge for Uyghur students to fit into the new and radically different culture.

Another finding of this study is that there was a significant relation between class organization and sociocultural adaptation profiles. Students belonging to the profile of well-adapted were more in mixed classroom than other profiles. This finding reflects the influence of intergroup contact on sociocultural adaptation. According to the intergroup contact theory [63], effective intergroup contact would increase intergroup trust and promote mutual cultural identity. Ethnic minority students in mixed classroom have more opportunities to learn and communicate with local students. The good learning atmosphere around them helps them develop good learning habits and motivate their learning. In addition, students from different ethnic groups have more opportunities to interact with each other, which helps deepen their understanding of each other's ethnic cultures.

Furthermore, we found that there was a significant relationship between students' hometown location and sociocultural adaptation profiles, with proportionally more urban students in the well-adapted and interaction adaptation groups than in the general adaptation and maladaptation groups. In contrast, students of the former two sociocultural adaptation profiles scored relatively higher in the dimension of interaction adaptation. This finding reflects the influence of cultural environment on interaction adaptation. Generally speaking, the development of rural regions lags

behind that of urban regions. Different development conditions affect the cultural diversity brought about by the frequent movement of urban populations, as well as the cognition of ethnic minority students. To be more specific, compared with rural regions, urban regions have frequent population movements, and so ethnic minority students from urban regions had more contact with the dominant national culture before they came to inland China. The constant blending of different cultures makes them face interaction adaptation problems earlier. After a long period of cognitive adjustment and skill learning, they have accumulated a considerable amount of interaction experience, such as getting along with members of the Han nationality, understanding the values of Han culture, accepting the differences between cultures, and so on, which is very helpful for their interaction adaptation after coming to the boarding schools.

Apart from hometown location, the results also showed that the interaction adaptation group had significantly higher family SES than other profiles, as well as the well-adapted group compared with the maladaptation group. In contrast, students of these former two sociocultural adaptation profiles scored relatively higher in the dimension of interaction adaptation. This finding reflects the influence of family SES on interaction adaptation. Many studies have shown that low SES affects the healthy development of children's social emotions [64,65], and as a result, children tend to produce negative social emotions, which are mainly manifested in children's externalized behaviors (such as fighting, difficulty in getting along with others, irritability, etc.). Therefore, children from families with lower SES tend to lack the necessary social interaction skills, which are detrimental to their lifetime development.

5.3. Recommendations for the Sustainable Development of the Interior Ethnic Boarding School System

The sociodemographic factors that we found to be associated with sociocultural adaptation profiles can be used to reveal the key groups of sociocultural adaptation intervention and provide a reference for further in-depth research and formulation of tailor-made interventions. On this basis, the following recommendations for the sustainable development of the interior ethnic boarding school system are put forward.

Strengthening multicultural training for teachers and students in these boarding schools. Multicultural training, targeting both the frontier ethnic minority students and teaching staff of the boarding schools, should be carried out before the school term begins. In this way, the ethnic minority students will learn about the relevant climate, environmental, and cultural characteristics of the city they will be going to, which will therefore prepare them for psychological acceptance. Further, the teaching staff of the schools will also learn about the eating habits, customs, and cultural traditions of these students, as well as their learning foundation, thinking characteristics, and so on. Mutual understanding between different cultures is critical for these ethnic minority students to reduce cultural strangeness and to adapt to the unfamiliar environment quickly.

Further carrying forward mixed-class education. Sherif et al. concluded through experiments that cooperation among youths of different ethnic groups is more conducive to the formation of harmonious ethnic relations [66]. Mixed-class education would provide a good cultural exchange platform for ethnic students. On this platform, students of different ethnic groups are of the same age, have the same learning tasks, and live in the same environment. Therefore, it is not only conducive to the improvement of academic performance of ethnic minority students but also conducive to interethnic communication among students of different ethnic groups.

Building a platform for multicultural exchange. According to intergroup contact theory [63], effective intergroup contact should increase intergroup trust and promote mutual cultural identity. The boarding schools should build a multicultural exchange platform to provide the ethnic minority students with more opportunities to contact the host society. For example, organizing students to participate in community fellowship activities on holidays, pair up with local loving families, and establish "hand-in-hand" cooperative relations with other local schools. By forming a "trinity" social integration network system of school–community–fellowship, students can integrate into

community life, get close to local community residents, and have a sense of belonging to the host culture, which will also enable the local community residents to have a deeper understanding of ethnic minority cultures.

6. Limitations

This study also has some limitations that require further research. Firstly, only sociodemographic data, such as gender, class organization, hometown location, family SES, and ethnicity, were selected to examine the association with sociocultural adaptation profile. However, factors related to sociocultural adaptation include both internal and external factors [50], while sociodemographic factors are only part of the internal factors. Other internal factors, such as personality, appraisal and coping style, and so forth, are also possibly associated with sociocultural adaptation. Moreover, previous studies have shown that other possible external factors, such as social support, length of residence in the new culture, prejudice, and discrimination, are also possibly associated with sociocultural adaptation [36,49]. Therefore, in order to obtain a fuller understanding of the factors that affect students' sociocultural adaptation, future research should consider all possible internal and external factors.

Secondly, this study only employed a cross-sectional survey of ethnic minority students in Grade 12. However, previous studies have shown that the psychological well-being may follow a curvilinear path approximating a U-curve [67], while social skills acquisition, including communications abilities, should reflect a linear improvement over time [68]. That is, sociocultural adaptation is a long-term process with different development stages that are closely related to time variables. Therefore, future research could consider conducting longitudinal tracking research to investigate the development process of students' sociocultural adaptation and to further get the whole picture of students' sociocultural adaptation.

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Article

Exploring Key Competencies of Mid-Level Academic Managers in Higher Education in Vietnam

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Abstract: Vietnamese higher education has been subjected to constant pressures and major changes in the last few decades so as to meet the country's needs for socio-economic development and to better prepare graduates for employment and personal growth. There has been greater recognition for the role of mid-level academic managers as key contributors to effective institutional performance and success. However, an understanding of what constitutes a competent mid-level academic manager, who are heads of faculties, departments, academic offices and specialized centers, for the context of Vietnam is limited. This study employs an exploratory and mixed-method approach to identify the core competencies required for mid-level academic managers at Vietnamese higher education institutions. Findings from focus group discussions and a survey conclude five professional domains for effective mid-level academic management and sustainable development yet, in the meantime, reveal the gap between institutional expectations and the actual competencies of academic heads as perceived by academic heads themselves, their supervisors and their team members.

Keywords: competency; heads of department; mid-level academic managers; mid-level management; higher education; sustainable development

1. Introduction

The higher education sector around the world has undergone profound changes in their missions and functions, fueled by accelerating globalization, technological advances [1–5], and public demands for accountability. To respond effectively to new demands and create a sustainable educational environment, management at all levels at higher education institutions (HEI) has begun to gain a greater awareness of their roles and missions than in the past [6], when the focus on leadership and management at higher education institutions has mostly been on top executives. However, previous studies suggest that what occurs at the mid-level, who are heads/directors of faculties, departments, academic offices, and in some cases research centers, contribute more significantly to institutional performance rather than those at the top [7–12]. Commenting on how the success and competitiveness of higher education institutions necessarily requires the effective functioning of mid-level academic management, Jones [13] argues that “there is no way in which the university's expectations will be realised if HODs [head of departments] as ‘middle managers’ are unable or unwilling to put them into action” [13].

As a developing country with demands of a skilled and competitive workforce, Vietnam has placed a great emphasis and made an extensive investment in upholding its tertiary education [14]. Improving institutional governance is among highly discussed topics in governmental and institutional policies; yet, mid-level academic leadership and management are still under-researched, despite their

importance for the sustainability of the Vietnamese academic system for the future. To the best of our understanding, a formal and quality understanding of what constitutes a competent mid-level manager for the context of Vietnam is limited. Recently, the Prime Minister of Vietnam has launched a national project to improve the quality of managers of higher education institutions in the 2019–2030 period [15]. This project has been central to the needs to meet the requirements of fundamental and comprehensive innovation in education and training. Furthermore, Vietnam education is also growing in fast pace, with significant rise in the position of Vietnam universities in the university rankings and scientific output [16–18], the quality of the leadership and management will contribute significantly to maintain the momentum of the development, as well as setting the conditions for future sustainability.

This paper seeks to highlight the competencies that are necessary for mid-level academic managers at Vietnamese universities. The study employs a mix of methods including content analysis, focus group interview, and survey to identify the core competencies required by heads of faculties, departments, academic offices and specialized centers. The findings from focus group interview and survey conclude five professional domains for effective mid-level academic management. Moreover, it also reveals the gap between the expected standards and the actual competencies of academic heads as perceived by academic heads themselves, their supervisors and their team members.

2. Literature Review

2.1. Mid-Level Academic Managers in a Developing Context

A mid-level manager can be defined as the one “below the small group of top strategic managers and above first-level supervision” [19]. In an educational setting and HEIs mainly, mid-level academic managers comprise heads/directors of faculties, departments, academic offices and, in some cases, research centers that serve to connect institutional strategies and implementation [11,20]. The critical role of departmental level management and leadership is highlighted as academic units are the base for various day-to-day operations at higher education institutions. Wolverson et al. [21] further emphasizes that 80% of the administrative decisions in colleges and universities are performed by mid-level academic managers.

Lan [22], on reviewing the changing governance and management model at higher education institutions, noted that mid-level academic managers are the group affected most by institutional changes. However, they can face serious and genuine challenges in becoming professional academic managers who can bring about the changes needed for institutions’ sustained performance [22,23]. For one thing, there is an issue of role ambiguity and role conflict [11,12,24–29] and blurring boundaries of authority and power [11,26,29–32]. For another, there is an issue of training and professional development. Different scholars have remarked on this lack of research into the professional qualities and professional development for heads of departments [13,26,27,29,33]. Nguyen [24] particularly points to the Western-biased nature of existing studies on mid-level academic managers, highlighting the need to understand mid-level academic leadership in a specific context and tradition.

Reviewing the discourses on mid-level management as early as the 1970s and the conceptualisation of middle management in higher education, Clegg and McAuley [34] found that middle managers have assumed different roles through time, originally as representatives of organisational values, then as conservative, self-directed agents of control, to more recently as transmitters of core strategic values and also agents of innovation and change in response to external changes. Traditionally, academic heads at higher education institutions are seen to be more concerned with the core academic values of their department than organisational values [20,34,35]. They are often elected among colleagues based on their research reputation and teaching excellence, and their leadership roles accordingly rest on their academic aspects. Therefore, heads of academic departments and offices tend to assume “the traditional academic styles of negotiation and consensus-building” [20] and the “good citizen chore” [20]. This has been argued to cause department heads to frequently disassociate themselves from managerial practices [34,35].

A shared perception now is that the role of academic heads nowadays is not purely operational or administrative, but “has evolved into something more strategic and empowering” [36]. Middle management is seen to be highly complex, multifaceted, multidirectional, and demands negotiation amidst networks of professional and power relations [29]. Meek, Goedegebuure, Santiago, and Carvalho [20] note that middle managers at institutions are increasingly expected to possess management capabilities, namely having the capacity to “define missions, objectives, and strategies”, “manage financial and human resources”, and “assume strong leadership” [20]. This is more apparent in the context of higher education institutions moving towards a corporate and autonomous model [23,37,38] under shrinking public funding, privatisation, benchmarking, and greater demands for accountability. The formulation and implementation of mission statements, strategic planning and quality assurance of universities have resulted in considerable expansion for the management duties of mid-level academic heads [22].

Under a changing management context, there are different competencies that mid-level academic managers need to demonstrate. Analyses of the performance of mid-level positions in Australian, British, and US higher education institutions [11,24,39,40] identify six broad categories of tasks that academic heads have to perform, namely department governance, programme management, human resource management, budget and resources management, external communication, and office management. The skills and knowledge that tap into these key tasks, which are summarized in Table 1, have been discussed by many scholars [22,24,33,39–41]. However, articulated knowledge and skill competencies required for effective departmental leadership and management are argued to be grounded on anecdotal evidence rather than on empirical and original research [22].

Table 1. Competencies required for effective mid-level academic management.

Domains	Competencies
Department governance	<ul style="list-style-type: none"> • Managing multiple roles • Having a clear sense of direction and strategic vision • Communicating departmental direction
Programme management	<ul style="list-style-type: none"> • Promoting high-quality teaching • Promoting faculty research
Human resource management	<ul style="list-style-type: none"> • Understanding faculty recruitment policies and procedures • Fostering faculty members’ capacity • Evaluating performance and providing feedback • Treating academic staff fairly and with integrity • Allowing the opportunity to participate in key decisions • Making academic appointments
Budget and resources management	<ul style="list-style-type: none"> • Understanding internal and external sources of funds • Providing resources to stimulate scholarship and research
External communication	<ul style="list-style-type: none"> • Interpersonal skills • Communicating effectively • Promoting the department’s image
Office management	<ul style="list-style-type: none"> • Decision-making • Resolving conflicts • Maintaining faculty morale • Creating a positive/collegial work atmosphere

2.2. Mid-Level Academic Management in the Vietnamese Context

To the best of our knowledge, research studies on leadership and management for the higher education sector in Vietnam are significantly underdeveloped [22,42]. There is a limited number of empirical studies on mid-level academic management, particularly on how-to training and improving the quality of department managers and leaders at a university. Based on the data of the responsibilities of heads of departments at Vietnamese universities, research studies found that Vietnamese mid-level academic managers act on three key areas: programme management, academic staff management, and facilities management [24,33]. The areas that are often neglected as a result of role ambiguity and a low

level of autonomy are strategic management, budget management, external relationship management, personal academic activities, and management of students and administrative staff. Vietnamese heads of departments often assume more of a generic managerial role—being more concerned with operational, day-to-day matters—than a leader’s role with strategic planning and thinking forward to the future.

3. Methods

3.1. Research Methods

This study employed a combination of content analysis, focus group interview, and survey to identify the key competencies and provide a competency framework for Vietnamese mid-level academic managers to thrive under the drastic change of the higher education system.

First, literature about mid-level academic managers was reviewed to identify the characteristics and the common tasks of a mid-level academic managers. We hsearched with keywords such as mid-level academic managers, academic managers, higher education management, and middle academic managers to identify a collection of suitable materials. The materials were divided evenly among the research team. Each member had to review the literature carefully and to check others’ reviews as well. Based on the literature review, the characteristics and the common tasks of Vietnam mid-level academic managers were determined by using job descriptions from seven Vietnamese universities. Content analysis was conducted to determine similarities and differences in these job descriptions to identify key management areas and required competencies of department managers.

Then, focus group interviews were conducted with Vietnam mid-level academic managers at seven universities to seek their opinions on the essential competencies to perform effectively. During the focus group interviews, a list of tasks, which was based on the analysis of job description, was provided. The interviewees were then asked to comment on the tasks in the list; and provide some necessary competencies that are required for performing each task. Eventually, a list of competencies that were required for mid-level academic managers at Vietnamese universities was finalized and then converted into a questionnaire. Nineteen competencies were identified as the potential competencies that were important for mid-level academic managers at Vietnamese universities (Table 2). These competencies were put into five areas: Leadership and management, Administration, Advising and consultation, Human resources management, and Self-management.

Table 2. Competency areas required of mid-level academic managers.

Codes	Essential Competencies
Le	Leadership and management
Le1	Leading change
Le2	Managing operations
Ad	Administration
Ad1	Formulating and processing management documents
Ad2	Building organisational culture
Ad3	Communicating information internally
Ad4	Applying information technology
AA	Advising and consultation
AA1	Creative problem-solving; conflict management
AA2	Presentation skills
AA3	Negotiation skills
PA	Human resources management
PA1	Allocating and using human resources
PA2	Evaluating performance and proving feedback
PA3	Coaching and mentoring
PA4	Building a work environment and motivating team members

Table 2. Cont.

Codes	Essential Competencies
AY	Self-management
AY1	Maintaining political and ethical qualities
AY2	Self-training, self-direction
AY3	Interpersonal skills
AY4	Collaborative skills
AY5	Adapting to changes
AY6	Using competently a foreign language

Finally, a questionnaire was distributed to mid-level academic managers, their seniors, and their faculty members to validate the list of competencies and to gain more insight into the professional practices of Vietnamese mid-level academic managers. Moreover, the essential competencies nominated for each key task were also identified by the participants. The questionnaire consisted of 38 statements with answers based on a five-point Likert scale. A score of 1 represented either the least essential competency or the competency that was not met by mid-level academic managers; meanwhile, a score of 5 represented either the most essential competency or the competency that was fully displayed by mid-level academic managers. The survey results were used for a comparison with the focus group discussions in order to come up with the final framework.

3.2. Sampling Methods

Note that the current governance structure in Vietnamese higher education is characterised as being heavily under state control [14]. Decision-making power stays primarily with the two national, three regional, and fourteen key universities [43,44], thus depriving more than 100 other universities and provincial universities of incentives to innovate [45]. Thus, to ensure diversity, mid-level academic managers and other staff and faculty members from seven Vietnam public universities were invited to participate in the study. These universities represent different type of higher education institutions with different sizes, organizational structures, autonomy levels, and geographical locations in Vietnam,

From the northern region of Vietnam is the University of Education, a member of Vietnam National University Hanoi that reports directly to the Prime Minister and has the highest level of autonomy and decision-making power, and Hanoi National University of Education, a university that reports to the Ministry of Education and Training (MOET) and has a high level of autonomy.

From the central region of Vietnam are Vinh University, a regional university under MOET's supervision with high decision-making power, and Hong Duc University, a provincial university that reports to both MOET and provincial authority and has the lowest level of autonomy.

Representing the southern region of Vietnam are An Giang University, Ho Chi Minh University of Education, and Dong Thap University.

The authors received responses from a total of 422 respondents (212 are mid-level academic managers) from the seven universities. Details of the respondents' positions in the universities are provided in Table 3.

Table 3. Positions and the number of respondents to the questionnaire.

Positions	Number
Rectors	10
Heads of offices	40
Deputy heads of offices and office members	172
Deans and faculty members	200
Total	422

3.3. Data Analysis

Responses from the survey were coded and entered in the statistical software SPSS (Version 20) and checked for reliability using the Cronbach's α reliability estimate ($\alpha = N\rho/[1+\rho(N-1)]$). A high reliability coefficient was achieved, with the Cronbach's α estimates ranging from 0.746 to 0.897 (≥ 0.6) (Table 4). The corrected item-total correlation estimates ranged between 0.5 and 0.7 (>0.3), also showing good correlations between the variables.

Table 4. Reliability estimates of the variables.

Factors	Observed Variables	Cronbach's α	Corrected Item-Total Correlation
Le	Le1, Le2	0.780	>0.3 (0.640)
Ad	Ad1, Ad2, Ad3, Ad4	0.820	>0.3 (0.515–0.749)
AA	AA1, AA2, AA3	0.746	>0.3 (0.502–0.672)
PA	PA1, PA2, PA3, PA4	0.818	>0.3 (0.583–0.716)
AY	AY1, AY2, AY3, AY4, AY5, AY6	0.897	>0.3 (0.592–0.792)

Then, an Exploratory Factor Analysis (EFA) was conducted to determine the correlation between the competencies and to determine their factor loadings. Kaiser–Meyer–Olkin (KMO) Test = 0.794 and Sig Bartlett's Test = 0.000 (Table 5), showing good correlations between the observed variables.

Table 5. Kaiser–Meyer–Olkin (KMO) and Bartlett's Test of the samples.

Kaiser–Meyer–Olkin Measure of Sampling Adequacy		0.794
Bartlett's Test of Sphericity	Approx. Chi-Square	3713.316
	df	171
	Sig.	0

The loading factors (≥ 0.509), as seen from the Rotated Component Matrix (Table 6), also showed good correlations between the variables.

Table 6. Rotated Component Matrix of the variables.

	Component				
	1	2	3	4	5
AY2	0.852				
AY5	0.845				
AY3	0.840				
AY4	0.834				
AY6	0.731				
AY1	0.695				
Ad3		0.876			
Ad2		0.838			
Ad4		0.779			
Ad1		0.672			
PA2			0.858		
PA3			0.818		
PA1			0.752		
PA4			0.739		
AA2				0.858	
AA3				0.813	
AA1				0.722	
Le1					0.882
Le2					0.857

4. Results and Discussions

4.1. Competencies Required of Vietnamese Mid-Level Academic Managers

The mid-level academic managers of our survey were asked to rate the extent to which they agreed that each of 19 competencies was necessary for an effective performance in their role. The data collected from the survey show a high level of agreement between heads of departments, faculty members, and senior leaders with regard to the key tasks needed to be performed by academic managers at the middle level and the essential competencies required for effectively performing these tasks. The mean values for the 19 competencies ranged from 3.63 to 4.04, confirming that all the competencies were perceived by the respondents to be important or very important to mid-level academic managers. The top 10 most essential competencies required of heads of departments and offices at Vietnamese universities are spread out across the four domains as shown in Table 7. The competencies that fall under the leadership and managerial domain were considered to be indispensable for heads of departments and offices. This resonates with Eley's [6] observation that heads of departments now regard their management role as being of greater importance than in the past.

Table 7. Top 10 essential competencies required of Vietnamese academic managers.

#	Domains	Competencies
1	Leadership and management	Leading changes
2		Managing operations
3	Advising and consultation	Creative problem-solving
4		Presentation skills
5		Negotiation skills
6	Human resources management	Evaluating performance and providing feedback
7		Coaching and mentoring
8		Building a work environment and motivating team members
9	Self-management	Maintaining political and ethical qualities
10		Self-training, self-direction

4.2. Competencies of Vietnamese Mid-Level Academic Managers

The opinions of university rectors, heads of departments, and faculty members from the participating universities about the extent to which the mid-level academic managers show their competencies were sought through the survey. The mean value range was 3.33 to 4.27, indicating that mid-level academic managers generally possessed a satisfactory level of leadership and management capacities. Mid-level academic managers were ranked the highest in terms of the ability to self-manage, provide consultation, perform managerial duties, and deal with administrative matters. The top ten competencies that most of the heads of departments possess are presented in Table 8.

Table 8. Top 10 competencies that most of Vietnamese mid-level academic managers possess.

#	Domains	Competencies
1	Self-management	Maintaining political and ethical qualities
2		Self-training, self-direction
3		Interpersonal skills
4		Collaborative skills
5		Adapting to changes
6	Advising and consultation	Creative problem-solving; conflict management
7		Presentation skills
8		Negotiation skills
9	Leadership and management	Managing operations
10	Administration	Formulating and processing management documents

4.3. How Well are Mid-Level Academic Managers Performing Against the Expected Competencies?

Comparing the mean differences, there exists a gap between the competencies required and the actual competencies displayed by Vietnamese heads of departments and offices (Figure 1). The surveyed department managers were scored lower in 17 out of 19 areas.

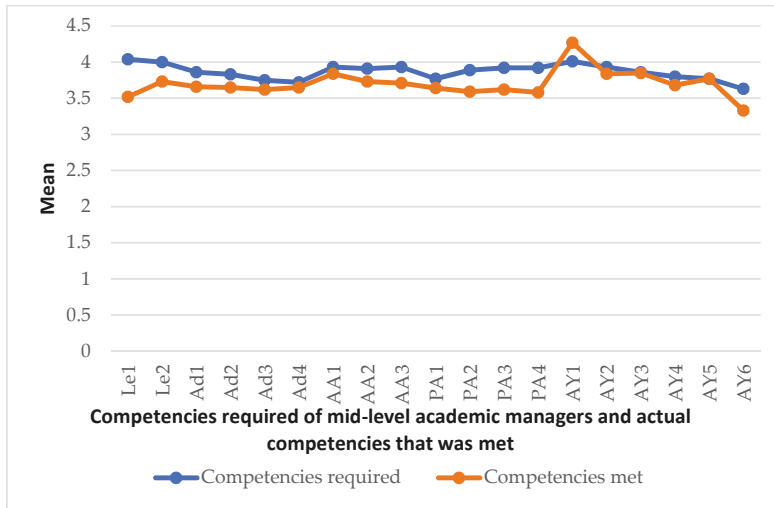


Figure 1. Competencies required of mid-level academic managers and actual competencies that were met.

The gap was the most noticeable for the capacity to lead changes [Le1] with a mean difference of 0.52, even though this was perceived to be the most important competency needed for department heads. The ability to lead changes and manage departmental operations was perceived to be the most important quality that heads of departments and offices need to possess ($M_{Le1} = 4.04$ and $M_{Le2} = 4$). For academic heads, strategic planning and leading changes necessarily mean creating visions and short and long-term goals for their department. This involves focusing the department's teaching and research priorities on areas where they can make a difference. Academic heads are expected to demonstrate this while working closely with their department's research committee, curriculum developers, and faculty members and on encouraging staff to contribute to ideas for department improvement. However, strategic management is a weak and neglected point for Vietnamese academic managers. Middle managers were more competent with day-to-day operational matters and ensuring that their unit functioned effectively, rather than with developing strategic planning and setting the vision for where the unit will head. This study found that academic managers often lacked the training, resources, and power they need to lead and drive changes. This resonates with Gallos's [46] comment that department-level managers at higher education institutions "have enormous responsibilities" yet "little positional power, insufficient resources, and limited authority" [46].

In the context of Vietnamese higher education, for one thing, this is highly attributable to the limited autonomy that institutions and faculties themselves can enjoy [14,47]. The functions and responsibilities of mid-level academic managers in Vietnam are still conceptualised under the state steering of higher education systems. Despite government initiatives to reform institutional governance, public universities in Vietnam remain heavily dependent on state funding to sustain their personnel, curriculum, and infrastructure [47–50]. MOET prescribes and monitors admission quotas, recruitments of academics, and curricular development. The capacity of middle managers to exert their authority and influence is therefore constrained under state centralisation and decision-making processes, which are characterised as being hierarchical and top-down [48]. For another thing, the low self-perceived

ability to drive changes by mid-level academic managers is a result of a so-called survival culture that Vietnamese universities and academic departments have for long adopted. As observed by Salmi [48], the majority of faculties only react to changes when they are forced to go. Therefore, to empower mid-level academic managers to assume a more effective leadership and managerial position, in addition to advocating more institutional and departmental autonomy, heads of units should be encouraged to be proactive and responsive in making department decisions. Lan [22] argued that heads of units should be required to make strategic development plan for their department and given the authority over staff recruitment and budget management.

The next professional areas that department heads were seen to fall behind the standards were the ability to evaluate performance and provide feedback, coach, and mentor, and build a facilitative work environment and motivate team members (PA2, PA3, and PA4). Despite the importance of human resources to the functioning of any organisations, the recruiting, mentoring, coaching, and evaluating the performance of team members were perceived to be not as important as other competencies expected and displayed by mid-level academic managers [51]. This points to the lack of departmental and institutional autonomy. With regard to the recruitment of team members, although heads of departments were often involved in the staff recruitment process, their authority was only extended to making recommendations for senior managers, mostly the rector and human resource manager, to decide on the candidate to be selected. Subject to the statement management of public universities, department heads could not also dismiss a team member who did not perform well if the employee had been awarded an official employment status. It is therefore apparent that the role of mid-level academic managers from Vietnamese universities with regard to developing department-level human resources was confined to following and obeying instructions from senior managers.

In the group of administrative competencies, the capacity to build the departmental culture, communicate information to team members, and apply ICT were not ranked very high as the competencies required of ($M = 3.77$) and displayed ($M = 3.64$) by academic managers. Only the capacity to develop and process management documents was ranked as highly important to effective departmental management. It was generally agreed that this is an essential part of the administrative tasks that heads of units have to assume. Bolton [52] argued that department leaders in the US and European universities often find it difficult to maintain their administrative presence as they are already overloaded with multiple tasks and duties. Moreover, it was also difficult for the mid-level managers to persuade and attain the consensus among their staff, such as in UK universities [53]. The situation for the Vietnamese universities surveyed was that most department leaders had to act simultaneously in the role of a lecturer, a researcher, and an administrator. Most emphasis was still being placed on the teaching competencies of faculty heads, leaving inadequate attention to their role in overseeing administrative tasks.

The capacity to self-manage has been considered a fundamental requirement for empowering both individual and organisational success and is placed at the core of leadership [54,55]. According to Rothstein and Burke [55], self-management is the foundation of “introspection, choice, priority setting, change, and development” [55]. It can be seen not only in an individual’s ability to adapt to changes but also in their interpersonal and collaborative skills and their self-directed capacity. In this study, department heads were perceived to be competent in most competencies under the self-management domain. The two areas that department heads felt to be performing at or above the standards are the ability to adapt to changes [AY5] and maintain their political and ethical qualities [AY1]. The ability of the managers to maintain political and ethical qualities ($M = 4.27$) was the strongest competency that Vietnamese heads of departments and offices were seen to display. This points to the fact that professional competencies of Vietnamese managers are influenced and conditioned by the country’s socio-political profile. The conception of laws and regulations for Vietnam’s higher education is linked to the country’s Socialist ideologies [56,57]. Institutional and department activities are formulated and implemented under the guidance of the Communist Party of Vietnam, and the educational direction of training programmes is often exercised as an administrative instrument of the Party [57,58].

The ability to use competently a foreign language [AY6] was seen to be the weakest among all the competencies. This was also an area that was perceived to be of the least significance to the performance and effective functioning of mid-level academic managers. For departmental management, the ability to communicate in English is necessary. Only academic heads who were in charge of international and foreign cooperation activities claimed to have the opportunity to use a foreign language and develop their foreign language skills. This means other heads of offices that deal with operational matters did not have the opportunity to use a foreign language at work. However, in the context of integration and internationalisation, in order for higher education institutions to enhance their competitiveness and the quality of their training, middle-academic managers need to improve their foreign language ability. This has important meaning, especially when the trend to internationalise faculties and curriculum is increasingly popular.

5. Conclusions and Recommendations

The identification of the core competencies for mid-level academic managers at Vietnamese universities provides useful guidance for identifying professional development needs and designing training and professional development programs for current and future mid-level academic managers. They are also useful for middle managers themselves to consider when they are reviewing and revising managerial competencies, skills or knowledge requirements. The study reveals that the management and leadership duties of middle managers are context-based and influenced by the country's socio-cultural profiles. Although academic managers are expected to assume six groups of competencies, they are self-perceived or perceived to be more competent to self-manage and perform day-to-day administration and consultation tasks.

Our analysis also shows that the ability to competently deploy foreign languages [AY6] was seen to be the weakest among all the competencies, which suggests as Vietnam's economy and higher education become increasingly internationalized, mid-level academic managers are not up to language-requirement standard. Another important result was that department heads felt that their strategic management skills were found to be a weak and neglected area. Previous studies have highlighted this weakness can be traced to the lack of institutional autonomy of academic managers in the context of Vietnamese higher education [24,33]. Finally, the ability to evaluate performance and provide feedback, coach, and mentor, and build a facilitative work environment and motivate team members (PA2, PA3, and PA4) was not of high standard. Of the weaknesses, language competency seems to be the easiest area to be fixed, yet, once improved it can allow mid-level managers to access to much wider pool of knowledge and opportunities. The Vietnamese government has tried to give the higher education sector more institutional autonomy, which means future studies can build on the results presented here to evaluate the progress of Vietnamese mid-level managers' strategic management skill and coaching skills. However, the mid-level managers still need to be proactive in overcoming the shortcomings and seize the opportunities in the current developing context in Vietnam [59]. Furthermore, the gap between the expected and actual standards has important implications for the training and retraining of heads of departments and offices in Vietnamese universities.

Mid-level academic managers in Vietnam universities is currently having a significant role in the development of higher education and science in Vietnam, and their contributions will be even more important for a sustainable future of the higher education system in Vietnam. Education in Vietnam is growing fast with the introduction and rising of a generation of new and financially abundant private universities, as well as new policies that enforce a new standard [16]. However, the new changes will pose new challenges for university heads, and indeed, heads of departments and offices. These findings will help the universities and education policymakers to understand the current situation, and build plans to provide a stable environment for the university, as well as Vietnam education, to thrive sustainably.

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Article

Reading Habits, Socioeconomic Conditions, Occupational Aspiration and Academic Achievement in Vietnamese Junior High School Students

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Abstract: Reading practices play an important role in the learning process of students. Especially in a fast-changing world where knowledge about nature and society is in a constant state of flux, book reading helps students foster skills such as thinking, valuing, adaptability and creativity for sustainable development. This research study used a dataset of 1676 observations of junior high school students from Northern Vietnam to explore students' academic achievement and its association with their reading passion, family socio economic condition, parental education and occupational aspiration. The empirical results show that higher grades in STEM-related subjects are predicted by reading interest ($\beta_{\text{Readbook}} = 0.425$, $p < 0.0001$), with students who love reading books achieve higher score than those who take no interest in books. Remarkably, the education level of the mother strongly enhances academic performance, with $\beta = 0.721$ ($p < 0.0001$) in cases of mother having a university diploma or higher. Students coming from wealthy families are more likely to buy books whereas borrowing from the library is the main source of books for students who grow up in not-rich families. However, even among wealthy families, investment into buying books still rely more on personal interest, despite the aforementioned educational benefits of book reading, as evidenced by an over 7 percentage point disparity between the likelihood of purchasing books among wealthy-family students who took an interest in reading (45%) versus students of the same background who did not like to read (38.7%). The results present implications for education policy making with a vision towards United Nations' Sustainable Development Goal 4: Quality Education.

Keywords: junior high school students; STEM; reading practices; occupational aspiration; parental influence; socioeconomic background; academic achievement; Vietnam; quality education; sustainable development goal 4

1. Introduction

1.1. A Brief Overview

Among the different pillars of sustainable development, including equitable economic development and environmental conservation, human capital is considered the epicenter that pulls together all the resources of a nation. The success of a country cannot be divorced from the capacity of its labor force to thrive and adapt to their own needs and societal demands [1]. The emergence of Taiwan, Hong Kong and Singapore as major exporters of advanced products has underlined the significance of human capital investment and acquisition of new capabilities [2]. The same message is proposed by the Boston Consulting Group [3] that by 2030, most countries will face labor shortages, and the key element to top economies in the world in this coming era is human capital.

Over half a century ago, Nobel laureate economist Gary Becker stated that the driving force for lifting labor productivity lies in education [4]. This is because education raises social aspiration and enables people to work towards the qualitative increase of living standards and life satisfaction. Educational attainment level is a key indicator which is associated with employment rates and social equity in a country [1]. The role of education in today's ever-changing world has become even more relevant as its ultimate goal has switched from transmission of knowledge to development of academic and vocational skills in order to extend the capacities of learners. It is commonly accepted that teaching literacy constitutes one of the main goals of education. By extension, self-education and lifelong learning in large part concern the skill of reading comprehension. It is indeed a means for acquiring new knowledge and skills through processing information in textual form, via various mediums including, but not limited to, newspapers, books, and technological devices [5]. A regular habit of reading helps develop a logical thinking mind and craft new ideas by constantly constructing meaning and gaining information from printed text [6]. More importantly, in the contemporary context of global radical technological advancement, language competency is the major tool for learners to adapt to the unprecedented changes and master necessary skills for the 21st century world [7–9]. Studies have suggested that avid readers have higher propensity for critical thinking [10] and self-direction skills [11], which are associated with more self-awareness, clearer life goals and higher achievements in adulthood [12]. Reading proficiency has also been found to be the predicting factor for academic performance, including Science, Technology, Engineering and Mathematics (STEM) subjects, as well as educational attainment at secondary level [13,14].

More recently, as the contribution of science, technology and innovation (STI) to sustainability is well recognized worldwide, investment in STEM education is the key to address issues of shortage and mismatch between skills to job demands in the long run. The United States was one of the pioneers focusing on the STEM education to save their future workers from job loss [15]. Concerns about advancing STEM education to improve the workforce capacity has then quickly become prevalent among educators and policymakers in developed as well as emergent countries such as England, Germany, Japan, Korea and Israel [16–19]. Definitions of STEM education as well as its theoretical concepts and frameworks have been widely researched and developed. Attributes of STEM have their roots in theories and ideas about learning process such as systems thinking [20], situated cognition theory [21–23], constructivism [24], or goal orientation theory [24]. Essentially, all these understandings about STEM share some common emphases: First, the teaching and learning of STEM take place under a combination of different domains, particularly highlighting Mathematics and Science and their connections. This interdisciplinary approach is necessary for developing systematic thinking.

Learning occurs when students take a holistic approach to explore new ideas/problems by connecting different parts to form a whole picture. Second, the learning activities in a STEM class should revolve around an authentic context. Understanding how the outcome skills and knowledge are relevant to real life situations is as important as the learning process itself. Third, STEM activities should be planned and organised from a learner-centred approach which incorporates engineering design process. Learning is optimised when learners are allowed to determine the expected outcomes for themselves and have control over the progress towards the outcomes in which they make sense of their personal learning experiences through problem solving as instructed by teachers. The extent to which sustainable development goals can be achieved through STI relies on the capacity of a system to provide people equal opportunity of access to lifelong education. This is the grounding platform for progression of human consciousness and sustainable development of a nation.

Research into the role of reading as a means for sustainable education, particularly in STEM subjects at the level of secondary education, would perhaps be beneficial in improving the efficiency of the education system in upscaling the quality of the labor force. This goal is even more critical for developing countries in order to avoid the “middle-income trap” where rising labor cost and skill shortages lead to recession in foreign investment [25]. However, most existing studies on reading behaviors and attitudes and academic aptitudes have been conducted in the context of educational systems in the English-speaking world, and largely in developed countries [26–31]. When evaluating the extant literature, one must be aware of the different practices in other cultural spheres [32–34], as well as the reality of social disparities in developing countries [35–38]. More specifically, the association between reading practices and STEM learning results at secondary level of education is generally understudied even in high income economies. It is thus crucial to investigate the reading interests and habits of young people in relations to their academic performance and other capabilities, especially with a view to the SDG4 (<https://sustainabledevelopment.un.org/sdg4>).

This study contributes to the current literature with insights from Vietnam, a lower middle-income country [39,40]. In particular, findings based on a 1676-observation dataset of Vietnamese junior high school students regarding the associations between their reading practices, access to print materials and performance in STEM subjects are examined. The effects of demographic factors and future career aspirations (as a measure of clarity of future life goals) on students’ academic (STEM) performance are also considered. Implications of the analyses of results in this study are of interest to parents, teachers, educators as well as policy-makers in nations with similar socioeconomic context.

1.2. Literature Review

1.2.1. STEM Learning Material and Performance in Scientific Subjects

Investigations of time spent on reading books, especially books related to schooling subjects showed a positive effect on academic achievement. For example, result from a survey with 8th grade students in the United States indicated that those who spend more time to read science-related materials got higher grades in scientific subjects in school. Remarkably, this investigation presented a strong correlation of subject attainment with the frequency of reading science related books [41]. Moreover, reading more science books outside of schools has shown positive effects on academic performance. A longitudinal United States-based study on 6th grade students has found that learners who read additional books about science outside of schools perform better in both reading and scientific subjects, compared to their counterparts who do not [42]. Reading books can also potentially help struggling pupils in improving their reading comprehension [27].

Another focus in literature of science related reading was STEM activities outside school. Out-of-school STEM activities has been proven to inspire students [43] and enhance their interest in scientific subjects, a motivation to learn more about science and a better perceptiveness of the world of science [44]. Both nonfiction science and science fiction books are highly appropriate materials for out-of-school reading activities because it can stimulate interests on chemistry and physics among

students as early as from middle school [45]. In particular, out-of-school activities that are well structured by levels of informal scientific programs may even steer students' occupational orientation towards natural sciences [43].

As such, it could be said that in STEM-related extracurricular activities are worth being considered when promoting natural science subjects. Such activities could be as simple as reading on STEM subjects. In fact, reading STEM materials presents a significant influence on readers' language comprehension. Earlier studies conducted by Corvette and his colleagues showed outperformance in comprehension, writing and vocabulary of science among students who, in addition to taking part in hands-on activities, have read scientific texts [46,47]. Another investigation led by Cervetti demonstrated a better information recall from reviewed text of students who read conceptually coherent science paragraphs compared to peers who read unassociated materials [48]. By reading texts related to STEM fields, students have the chance to acquire STEM fields-related vocabulary and use them as a tool to reflect their own understanding, which support the development of technical and theoretical ideas in learners [49]. Interestingly, for student themselves, improving language skills is a reason to read non-academic books outside of school [31].

1.2.2. Preference of Reading Topic and Reading Intensity

Given that the activity of reading showed positive influence in students' academic performance, researchers are also interested in favorite reading materials among today's adolescents as well as why those kinds of materials are preferred. The first remarkable investigation might be mentioned conducted by Moje and her colleagues (by interviews and observations) on the content of the reading material and the frequency of reading outside of schools, among youths aged 11 to 17 from an urban community [50]. The result presents a significant relationship between novel-reading regularity and academic performance. Interestingly, most young participants did not like to read about science outside of school [50]. This phenomenon has been observed in other studies, some of which claim that student's interest in scientific information text is developed in relation to other domains such as the interest and reading culture of the family or the career of parents [26,51]. However, a number of investigations conducted in developed countries concluded that scoring higher in tests and examinations is a reason for upper primary school students to read books frequently (with 62% of responses) [31], for college learners to spend more time to read scientific articles [52].

On the aspect of time, in this case with respect to reading frequency, an investigation on 5th-graders in the U.K. and their reading habits at home showed that 51% of students read story books (excluding textbooks) daily while 35% of participants said they only read a few times a week. In regards to school books, nearly half of participants (45%) said that they have never read a textbook at home and 23% of students reported that they read such books "a few times a week" [53]. Moreover, the finding from 288 3rd grade students in the US reveals that both males and females spend more time reading adventure stories because they find these materials relaxing and enjoyable [54]. Pleasure seems to be the most significant motivation for youth to spend time for reading [50,55].

Preferred types of reading materials which inspire school age children to read outside schools were also examined by various researchers. Interestingly, most of reviewed literature reveals the correlation of students reading frequency and non-academic texts. A study with the participation of 5th grade children coming from various populations (in terms of SES and ethnicity) found that they spend more time reading comic books and magazines outside of school [56]. Other investigations in developed contexts reported that comic and magazines were also popular choices for both primary and secondary school English students [57] and for primary students in Singapore at home [31]. For urban adolescents, magazines seem to be the most attractive reading material (with 68% of males and 76% of females). The majority (69%) of 1340 middle school students in the U.S. said that they read more than two books per month at home [58]. Additionally, the second favorite reading material among youths was comic books or books about sports (by boys) and musicians (by girls), all of which amounted to a total of 44%. Only 30% of participants choose the category "books for pleasure" when asked about what they liked

to read. Additionally, short stories and picture books were chosen mostly by high-poverty students' reading for pleasure and reading for pleasure is strongly correlated with reading frequency [50].

1.2.3. Socio-Economic Status and Access to Books

Studies have identified the two most common sources of books for children: purchased sources (bookstores, subscriptions, parental purchase) and borrowed sources (classrooms, schools and public libraries). However, the popularity of these sources varied across studies. Earlier research confirmed school libraries as the main access to books [59–62] whereas more recent findings highlighted the dominance of purchased sources [63]. Furthermore, Worthy and colleagues also found that learners eligible for free lunch (i.e., those from low income families) were more likely to borrow books from libraries than to buy them [63]. Apart from financial constraints, one explanation is that fewer books are available for purchase and less bookstores can be found in high poverty neighborhoods than in middle-class ones [64]. This could account for the gap in reading frequency and proficiency between students in low-income and high income groups during the summer when they do not have access to school libraries [65].

An international investigation on family SES and attitudes toward reading among 4th grade students in 33 countries conducted by Chiu and Chow reported that SES factors and home educational resources were strongly related to learners reading scores. The reading scores of higher SES students are higher in comparison with those of lower SES groups, the result was explained by more books being available in richer homes and more favorable attitudes toward reading presented among higher SES parents [66]. In contrary, children from poor or low SES families seem to be poor readers in later education level due to the lack of reading resources at home and lower family literacy [56,67].

Children from higher socio-economic families show more interest in reading due to having more opportunities to read. According to a number of researchers [68–70], families with higher level of income, families with more money, better job status and educational level tend to have more books at home, which can encourage children to start reading and to read on a regular basis. This evidence was supported by later research findings [66,71]. Vastly different book genres at home also means that children have more reading choices, which stimulates their interest to develop frequent reading habit [72]. On the contrary, children from less favorable socioeconomic backgrounds tend to watch more television [56]; they also have to focus more on helping their parents do household chores, or even earn money, rather than spending time on reading [73]. In addition, low income parents did not purchase books due to the lack of money [74]. Several studies have also found that reading is of less enjoyment for children of lower socio-economic backgrounds than those from more advantageous social class [75]. Statistics from PISA 2009 of Australia reported that 33% of students of the lowest SES quartile claimed they did not read for enjoyment, while 17% of the highest SES quartile gave the same answer [76]. Other than the lower level of exposure, it seemed that the usually lesser amount of parental attention in relations to reading habits [77], which was associated to lower socioeconomic backgrounds, played a role in forming reading enjoyment among children. Encouraging children to read seems to be a tough task for parents who come from low SES homes, whereas reading is seen as entertaining among children from higher SES [78]. In fact, the latter often considers reading as a source of pleasure, and they enjoy reading, and see the values of reading. School-age learners are more likely to read books that they find interesting, and enjoy reading thanks to encouragement from their family [79]. Low SES students lack not only the access to books [80], but also this familial encouragement.

In order to address this issue and provide support to disadvantaged children, book give-away programs have been implemented, attracting a large number of research studies examining their effectiveness. Particularly, scientists have found that being given books for ownership is more influential to children than borrowing, even more so if they are allowed to select books of their preference [81]. In other words, the gap in summer reading between different socio-economic groups can be shrunken by simply supplying children with books that they wish to have and can read [82,83]. Other results from the National Literacy Trust's first annual survey have associated book ownership with increased

interest in reading, reading frequency, reading length, number of books read in a month and number of books available at home. The researchers also found that for school-age students who own more books are more likely to be white girls from higher income families [84]. It is therefore reasonable to expect solid links between socio-economic and demographic (namely gender and ethnicity) backgrounds, the accessibility to reading materials, on the one hand, and children's reading habits, on the other hand.

1.2.4. Diversity of Book Genres and Reading Habits

The improvement of regular reading habits of students is strongly influenced by reading culture both in families and schools. In school context, both teaching staff and learners need to access various reading materials to improve the teaching and learning quality in the classrooms [74].

The diversity of books in school libraries has also been examined in relation to the reading habits of students and their attitude towards reading. Research studies in both low and high contexts have shown that vastly different books in school and classroom inspire students to read in and outside school. According to a study based in Botswana, the relationship of reading habits in elementary school pupils and the availability of reading materials in schools have also been examined and confirmed to be positive [85]. An impressive result from the project known as "Book Flood" that aims to increase the number of reading materials in schools in Fiji, Singapore and Sri-Lanka (from 100–200 books delivered to each primary school participated into the project) show a dramatic improvement in reading, and other language skills as well as the positive changes of children's attitudes towards reading [74]. Other investigation also reveals that students are more interested in reading if they access or find the desired books [56,86] and even, the time spend by US urban adolescents to read could be reduced (from 6 days to 2 days per week) due to the lack of wanted books [87]. The investment in school libraries with a variety of reading materials should be increased in order to enhance learners' reading and achievements [88].

Among the factors indicated as deterrent to school-age learners' reading habits, inadequate availability of reading materials in schools was rated more highly by surveyed participants [85]. His investigation on reading habit and books availability in primary schools presents that children's reading habit cannot be developed in the schools without a sufficient amount of books available in their libraries. With the fact that most of books in schools are textbooks and teachers' notes, it can explain why more than half of children (53.3%) spend 1-2 h per day to read, the result also shows that some learners read for less than an hour a day. Moreover, the lack of engaging leisure reading materials is one possible reason only 25% of Singaporean young children borrow books from their school library [31].

A wider variety of genre, authors from classic to contemporary literature that allow students to read in and out of schools is considered as a worth reading resource which provide readers opportunities to travel to other worlds and possessed different existing cultures had been claimed on students reading examinations. The richness of books in schools and homes were indicated as the construction of reading identities and "finding" and "regular daily picking up" books that allowed Singaporean school boys to score high in reading achievement as global literate citizens [89]. Students who spend more time on reading favorite comics books claim that they get their reading materials primarily from the school libraries (71%) and the classroom (53%) [58]. By this result, school library seems to be primary to enhancing students' reading.

1.2.5. Parent's Education and Career and Student's Academic Performance and Occupational Aspiration

Some researchers proposed that parents of higher educational backgrounds are more aware of the benefits of reading and thus tend to provide their children with more opportunity to read [90] and their children gained higher score in scientific subjects compared to their peers [41]. It is also worth noting that mothers play a more important role in forming children's reading habits at home than fathers since they spend more time on reading, teaching and encouraging their children to read more frequently

than fathers [57,91]. Moreover, well- educated parents seem to encourage their children to pick up reading more [92,93] to procure additional cultural capital that will strongly support their kids [94]. A study on 11th–12th grade students in the US reveals that students whose parents appreciate the values of STEM fields get higher scores in math and science [95]. Additionally, after high school, a number of those students chose to enrollment in college STEM major or present interest in STEM related fields. This seems to be closely linked to the parents' active efforts at encouraging their children to learn about STEM fields, especially at early stages of schooling [45,96].

High scores in Math and Science and participation in STEM competitions are proven to be positively linked to occupational orientations towards STEM fields regardless of SES [43,97,98]. A data presented by Wang [97] showed significant direct effect of 12th-grade math achievement on STEM entrance. Impressively, positive association of math achievement at the 12th grade with intention to pursue STEM fields has been found among students from White communities but it was found null for their Asian counterparts [97]. However, other study confirms that there is no different in math performance between White students and Asian students in the U.S. [99]. This study also mentions that the students who reach a well preparedness of math and science in high school are like to be interest in STEM major. Academic preparedness seem to be a strongest predictor for choosing a STEM subject also claimed by Miller et al. [98]. Moreover, with the increasing popularity of STEM-related competitions (IT, technology, robotics, science fair, or others related science) as out-of-school activities, a survey with freshman students from four year and two year American institutions conducted by those authors reveals STEM career are likely to be chosen more by participants who took part in any STEM contest compared with participants who was not involved in any STEM contest. For example, students who participate in a computer or IT contest are 3.72 times more likely to follow a computer science related career after high school than their peers who did not involve in any similar competition [98].

The difference of parents' influence on children's math and science choices has also been examined [100]. While non-significant influence of father' level of education and mother' level of education on STEM career have been found in Miller's survey [98], other investigations showed a positive influence of parents on children' subject choices. Namely, when parents want their children to perform better in math, they tend to provide more material resources as well as time in guiding and encouraging their children to get involved in extra-curricular activities related to math [100,101]. Impressively, parents who have high educational expectation for their kids will likely to provide substantial support and encouragement to the child to gain better academic performance [99]. It is worth noting that parents expect differently from boys and girls, in terms of academic achievements in the subject of math [100].

Some scholars have suggested that SES is a significant predictor of science and math scores, based on evidences such as surveys on high school students attending public and private schools in America [93,101]. According to these results, higher SES and higher level of education of parents were considered two significant predictors of better 10th grade math score. In the same vein, English students who chose and science and math as their study focus and achieved high results often came from advantageous SES backgrounds. The majority of higher education students in the U.K. who chose scientific disciplines, especially natural sciences, come from advantageous SES groups [102]. The suggestion was supported by more detailed studies, according to which students whose parents work in agriculture or manual labor and/or had a low educational level tend not to report STEM related occupations. One of the possible explanations stated by the authors was the student's awareness of the variety of career options; namely, that students from wealthier backgrounds are more aware of the range of occupational choices they could make [103].

Additionally, the parents' interest in STEM fields also must not be ignored due to its influence on children's future career choice. Students with an interest in science are significantly more likely to claim that their parents are interested in science, than students who present little to no interest in science [51]. However, STEM-related career suggestions made by parents are also often influenced by gender-based stereotypes; for example, mothers are likely to guide their girls to choose non-scientific or

humanities-related careers while both mothers and fathers tend to recommend careers related to physics or other “hard sciences” for boys to follow [104]. It is worthy to note that mothers’ predictions and beliefs in an adolescent’s success in math and science seem to be a strong predictor to the adolescent’s actual choice of discipline to follow after high school [104]. Finally, on the association between gender and interest for scientific disciplines, there is little consensus in the literature. Many studies found that females stated lower level of interest in the fields related to STEM such as medical science, chemistry, especially engineering than males [105,106], whereas others said there was no significant link between gender and orientation towards any of the STEM careers [103]. That being said, representation in STEM competitions was found to be the same between males and females; females, in fact, performed slightly better than males [43,105].

Globally speaking, students who have more opportunities to be involved in science-related context, STEM activities or interest in Math and Science are more likely to select a STEM-related occupation [43]. Especially, students from high SES, who receive more attention and cultural investment into STEM from their parents at early stage see STEM career is a good field [45].

1.3. Concepts and Notions

The following notions in our conceptual framework are necessary for a thorough understanding of the study.

The activity of *reading* is the focal point of the study. Reading should be understood in its most encompassing [107] in fact, students were not restricted from any interpretation ‘reading’ while filling the survey. As such, reading materials could be of any genres (i.e., including comic books, magazines, etc.) and any mediums (i.e., including e-books, digital newspaper, etc.).

Reading interest refers to the response to a question in the original survey: “Do you like to read?” This is a self-reported indicator of whether or not respondents take an interest in the activity of reading. The measure is represented by the dichotomous variable “Readbook”.

We often employ the term *academic achievement*, or in more concrete cases *average score*, to refer to the respondent’s average score in their most recent 45-min tests in the four separate subjects of Mathematics, Physics, Chemistry and Biology. Tests in Vietnam are graded from 0 to 10, to the second decimal digit. Average scores in Vietnam can be calculated down to the third decimal digit [107]. In the survey, students did the calculation of their scores themselves with the help of their teachers. This indicator is coded as *APS45*.

Occupational aspiration corresponds to the question “Which job would you like to have in the future?”. The question was open; students could name any occupation that came to mind, all of which were recorded. For the specific scope of this paper, however, we have decided to only consider two categories of students: those who were able to name a dream job and those who were not. We coded this as variable *FutureJob* in our dataset.

1.4. Research Questions and Hypotheses

RQ1: Does the interest in reading books and favorite types of book affect the average score of students’ 45-min tests of math, physics, chemistry and biology?

RQ2: Is there a correlation between reading interest, type of books and the amount of time spent reading social sciences and humanities books versus time spent reading natural sciences books?

RQ3: How do reading habits and financial status of the student’s household affect students’ book sources?

RQ4: How do reading habits and the students’ evaluation of the classroom bookcase influence the amount of time spent on reading natural sciences books and social sciences and humanities books?

RQ5: Do the presence of an occupational aspiration and the level of education of parents affect student’s 45-min tests of math, physics and chemistry?

The hypotheses correspond to the research questions as follows:

Hypothesis 1 (H1). *Reading habits and interest in natural sciences books positively predict the average score of students' 45-min tests of math, physics, chemistry and biology*

Hypothesis 2 (H2). *Favorite type of books and interest of reading books are statistically associated with the amount of time spent on reading natural science books and on reading social science books.*

Hypothesis 3 (H3). *Interest of reading books and the financial status of students' family have a statistically significant influence on the source of book supply*

Hypothesis 4 (H4). *Interest of reading books and the variety of bookcase in the classroom would be positively associated with the likelihood of reading types of books more than 30 min a day.*

Hypothesis 5 (H5). *The future job, education level of fathers and mothers are positively correlated with the average score of students' 45-min tests of math, physics and chemistry.*

2. Materials and Methods

2.1. Materials

2.1.1. Dataset

From December 2017 to January 2018, Vuong and Associates office conducted a survey entitled "Studying reading habits and preference of junior high school students in Vietnam". A questionnaire has been designed specifically for the survey, consisting of 26 multiple-choice questions as a majority as well as 3 open questions. These questionnaires were then sent out to junior high schools in the northern Vietnamese province of Ninh Binh. Junior high school students, aged 11 to 15 (from grade 6 to grade 9), were randomly selected to respond to the questionnaires directly, in written form, after having received thorough explanations from their instructors to ensure accuracy and validity of the records. The dataset employed in this paper is a result of the aforementioned survey, consisting of 1676 observations.

2.1.2. Variables

Since we are interested in examining determinants of average scores in math, physics, chemistry and biology of students' 45 min tests, of the amount of time spent on reading natural science books and social and humanities books and of the source of book supply, the following variables were respectively analyzed as the dependent variables:

- *APS45*: the average score of the most recent 45-min tests in mathematics, physics, chemistry and biology. The variable is treated as continuous;
- *TimeSci* and *TimeSoc*: time spent daily reading natural sciences books and social sciences and humanities books, respectively, and self-reported. These variables both consists of two categories: under 30 min ('less30') and 30 min or over ('g30');
- *Source*: the main source of supply from which students obtain books. This was recorded through a multiple-choice question, which the respondent answered by choosing only 1 out of 3 options: borrowing from friends or libraries ('borrow'), using their own or their parents' money ('buy'), or receiving books as gifts or rewards ('gift').

The analyses would also contain the following independent variables:

- *Readbook*: whether or not a student is interested in the activity of reading, with two answers: 'yes' and 'no';

- *Topic*: student's most preferred reading topic. The student was required to choose only one from a list of options, consisting of: math—physics ('math.phy'), literature ('literality'), foreign languages ('language'), natural sciences, chemistry, and biology ('nat.chem.bio'), history and geography ('his.geo'), information technology ('tech'). This variable was not directly used in the analyses, but recoded into variable *Topicgr*;
- *Topicgr*: this variable is a recode of variable *Topic*. It collapses the categories of variable *Topic* into 2 groups: Group 1 ('gr1') consists of 'math.phy' and 'nat.chem.bio' and group 2 ('gr2') consists of 'literality', 'language', 'his.geo', 'tech' and notans;
- *Bookcase*: student's evaluation of the common bookcase in the classroom. The student responded by choosing only 1 out of 4 options: diverse and interesting ('a'), missing good titles ('b'), lacking books ('c') and no bookcase ('d'). This variable was not used directly but recoded into variable *Bookcasegr* for analysis;
- *Bookcasegr*: this variable has been recorded from *Bookcase*, grouping categories 'a' and 'b' into 'variety', and 'c' and 'd' into 'novariety';
- *Typebook*: student's preferred book genre if ever being gifted a book, excluding textbooks. The student was required to choose only one of the following four options: Novel ('a'), Biography ('b'), Popular Science ('c'), Arts ('d'), Vocational instruction ('e'), and Other ('f'). This variable was not used directly, but recoded into *Typebookgr* for further analysis;
- *Typebookgr*: recoded variable from *Typebook*, grouping 'a', 'b' and 'd' into 'gr1' and 'c', 'e' and 'f' into 'gr2'. Group 1 as represented by 'gr1' consists of novels, biographies and arts, which are characterized by the story of human and human relationships. This group of book type is either fiction books or social sciences and humanities books. Group 2 as represented by 'gr2' is comprised of the genres popular science and vocational instruction (and others), which could be considered non-fiction or natural science books because they mainly focus on practical knowledge and vocational skills;
- *EcoStt*: self-reported financial status of the student's household. The student was required to choose one option from a list of three: rich ('rich'), medium ('med') and poor ('poor'). This variable was not directly used but recoded into *EcoStt2* for analyses;
- *EcoStt2*: recoded from *EcoStt*, this variable collapses 'rich' and 'med' into 'notpoor'; 'poor' remains its own category;
- *Readstory*: whether or not the respondent's parents read books for them, with two answers: 'yes' and 'no';
- *FutureJob*: the presence of concrete future occupational aspirations, self-reported. Respondents who are able to give a concrete answer were coded as 'define'; the rest were 'undefine'.
- *EduFat* and *EduMot*: refer to academic level of the father and the mother. Academic level contains 4 items: Under high school ('UnderHi'), high school ('Hi'), Undergraduate ('Uni'), Graduate school ('PostGrad').

2.2. Methods

Responses were entered into a Microsoft Excel spreadsheet; the XLS file was then converted into CSV to be treated in R. Baseline-category logit (BCL) model were used to analyze the relation between pairs of variables, or between a dependent variable and multiple predictor variables [108].

General linear model (GLM) was utilized to explore the association between independent variables x a continuous dependent variable Y . The equation obtained can be formulated as follows:

$$Y = \beta_0 + \beta_i x_i$$

in which β_0 is the intercept and β_i is the coefficient corresponding to each independent variable.

Binomial and multinomial logistic regression was employed to estimate the probability of a category of dependent variable Y against different values of independent variables x , in order

to assess how the response variable varies when the predictor variables change. Through these regressions, estimate coefficients were obtained and later used to compute conditional probabilities.

The general equation of the logistic regression model is as follows:

$$\ln \frac{\pi_j(\mathbf{x})}{\pi_j(\mathbf{x})} = \alpha_j + \beta'_j \mathbf{x}, j = 1, \dots, J-1.$$

in which \mathbf{x} is the independent variable; and $\pi_j(\mathbf{x}) = P(Y = j|\mathbf{x})$ is the corresponding probability. $\pi_j = P(Y_{ij} = 1)$ with Y being the dependent variable.

The probability of the values of the dependent variable is calculated as follows:

$$\pi_j(\mathbf{x}) = \frac{\exp(\alpha_j + \beta'_j \mathbf{x})}{1 + \sum_{h=1}^{J-1} \exp(\alpha_h + \beta'_h \mathbf{x})}$$

with $\sum_j \pi_j(\mathbf{x}) = 1$; $\alpha_J = 0$ and $\beta_J = 0$; in which n is the number of observations in the sample, j are the categorical values of an observation i , and h is the number of rows in matrix \mathbf{X}_i .

The statistical significances of all models in this paper were assessed based on z -value and p -value, with $p < 0.1$ as the threshold for statistical significance.

3. Results

3.1. Descriptive Statistics

The data shows that students are distributed rather evenly between the four school grades, with sixth graders taking the largest share in the sample (~28%). 95% of student at 6th grade responded that they are interested in books whereas only 82.3% of 9th grade students like reading books. The number of male and female students is relatively similar. Students mainly access books by borrowing from friends or libraries (approximately 61%). About 37% of students purchase books, and a very small amount of students receive books as gifts or rewards (2.57%) [109]. Regarding the financial status of students' households, the majority of students come from families with a medium level (82.33%); a small number of students report to come from rich and poor families (11.1% and 6.57% respectively). In particular, within the grade 6 group, nearly 76.7% respondents grew up in medium economic conditions while 16.7% reported that their household was rich.

Notably, most of the students who were interviewed had a concrete idea of their preferred future job (99.34%). In the dataset, students mentioned 104 different jobs among which "doctor" is the most favored (18.14%), closely followed by "police officer" (13.15%) and teaching profession (11.29%). The remaining jobs are evenly distributed with a low percentage. Distribution of categorical variables that were used is shown in Table 1.

Table 1. Distribution table of some categorical variables.

Code Name	Explanation	Items	Frequency	Proportion
Grade	Current grade	Grade 6	467	27.86%
		Grade 7	443	26.43%
		Grade 8	410	24.46%
		Grade 9	356	21.24%
Sex	Biological gender	Male	853	50.89%
		Female	823	49.11%
Source	Main source of supply for books	Buy	617	36.81%
		Borrow	1016	60.62%
		Gift	43	2.57%
		Rich	186	11.10%
Ecostt	Economic condition of the family	Medium	1380	82.33%
		Poor	110	6.57%
		Group 1 ('math.phy' and 'nat.chem.bio')	578	34.49%
Topicgr	Answer to question: "Which reading topic do you prefer?"	Group 2 ('literality', 'language', 'his.geo', 'tech' and notans)	1098	65.51%
		Group 1 (diverse and interesting ('a'), missing good titles ('b') into 'variety')	1092	65.15
Bookcasegr	Evaluating classrooms' public bookshelves	Group 2 (lacking books ('c') and no bookcase ('d') into 'novariety')	584	34.85
		Under 30 min	846	50.48%
TimeSci	Time per day spent on natural science books	30 min or over	830	49.52%
TimeSoc	Time per day spent on social science—literary books	Under 30 min	1065	63.54%
		30 min or over	611	36.46%
EduFat	Academic level	Under high school	1068	65.6%
		High school	433	26.6%
		Undergraduate	97	5.96%
		Graduate school	30	1.84%
EduMot	Academic level	Under high school	1033	62.34%
		High school	435	26.25%
		Undergraduate	156	9.41%
Readbook	Answer to question: "Do you like reading books?"	Graduate school	33	1.99%
		Yes	1512	90.21%
Futurejob	Answer to question: "In the future, which job do you like most?"	No	164	9.79%
		Define	1665	99.34%
		Undefine	11	0.66%

Table 2 is the information for the continuous variable 'APS45'.

Table 2. Average score of the most recent 45-min tests of Math, Physics, Chemistry and Biology of students.

Coded Name	Unit	Explanation	Mean	Min	Max	Standard Deviation
APS45	Count	Average score of the most recent 45-min tests of Math, Physics, Chemistry and Biology of students.	19.95	2.30	9825.00	348.01

The distribution of average score of the most recent 45-min tests of math, physics, chemistry and biology of students can be seen in Figure 1:

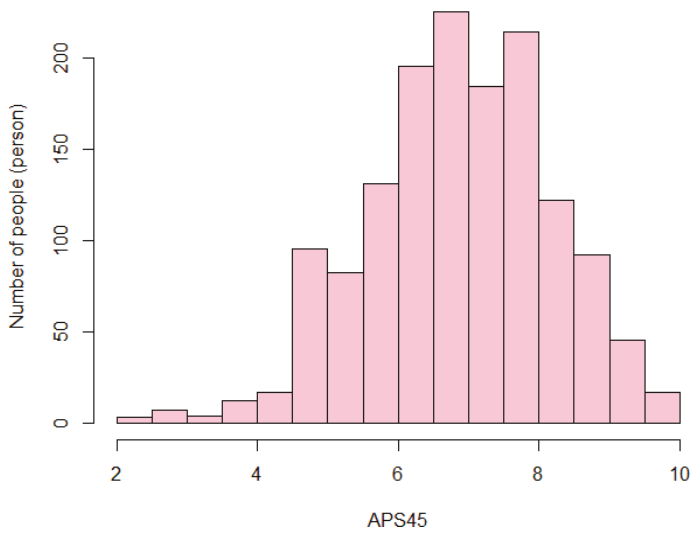


Figure 1. Distribution of the average score of the most recent 45-min tests of math, physics, chemistry and biology of students (recreated from [109]).

3.2. Regression Results

3.2.1. RQ1–H1

Does the interest in reading books and favorite types of book affect the average score of students’ 45-min tests of math, physics, chemistry and biology of students?

We employed GLM estimation with the continuous variable “APS45” as dependent variable against two independent variables “Readbook” and “Topicgr”. “Readbook” and “Topicgr” were treated as dichotomous variables. The result is shown in Table 3, which displays that all correlations are statistically significant ($p < 0.0001$). As can be seen that, students who reported an interest in reading book score higher than those who did not, by 0.425 point. Book topic preference was also predictive of grade, in which students who preferred to read about natural sciences (mathematics, physics, chemistry and biology) acquired higher score than students choosing other topics.

Table 3. Estimate results of “APS45” by “Readbook” and “Topicgr”.

	Intercept	“Readbook” “yes”	“Topicgr” “gr2”
	β_0	β_1	β_2
“APS45”	6.808 *** [53.896]	0.425 *** [3.637]	-0.265 *** [-3.650]

Significance codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05; t-value in [square brackets]; baseline category for: “Readbook” = “no”, “Topicgr” = “gr1”. Null deviance: 2469.5 on 1443 degrees of freedom. Residual deviance: 2418.4 on 1441 degrees of freedom. AIC: 4850.6.

Observing that “Topicgr” at “gr2” yields a negative coefficient, it is worth keeping in mind that “gr2” denotes social sciences and humanities books. As such, this result confirms the hypothesis.

3.2.2. RQ2–H2

Is there a correlation between reading interest, type of books and the amount of time spent reading social sciences and humanities books versus time spent reading natural sciences books?

To test the relationship between reading interest, favorite types of books and duration of time spent on reading books, we ran two models employing logistic regression, where “TimeSci” and “TimeSoc” are dependent variables and independent variables are “Typebookgr” and “Readbook”. The results are presented in Table 4:

Table 4. Estimate results of “TimeSci” by “Readbook” and “Topicgr”.

	Intercept	“Typebookgr”	“Readbook”
		“gr2”	“yes”
	β_0	β_1	β_2
logit(g30 less30)	-0.924 *** [-4.822]	-0.571 *** [-5.610]	1.253 *** [6.475]

Significance codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05; z-value in [square brackets]; baseline category for “Typebookgr” = “gr1”, “Readbook” = “no”. Null deviance: 2323.3 on 1675 degrees of freedom. Residual deviance: 2238.4 on 1673 degrees of freedom AIC: 2244.4.

Using estimate coefficients, all probabilities are calculated similarly to the following example, which gave the “TimeSci” = “g30” probability of a student who prefers Group 2 books (“Typebookgr” = “gr2”) and reportedly takes an interest in reading (“Readbook” = “yes”):

$$\ln\left(\frac{\pi_{g30}}{\pi_{less30}}\right) = -0.924 - 0.571 \times gr2 + 1.253 \times yes$$

$$\pi_{g30} = \frac{e^{-0.924-0.571 \times 1+1.253 \times 1}}{1 + e^{-0.924-0.571 \times 1+1.253 \times 1}} = 0.439$$

The probability of “TimeSci” by “Typebookgr” and “Readbook” is described in Table 5 and visualized in Figure 2. Reading interest and favorite type of book could predict the time spent reading natural sciences book. Namely, being interested in reading (Readbook = “yes”) and preferring natural sciences books (Typebookgr = “gr2”) are predictive. Indeed, students who answered yes to “Readbook” and were interested in “gr1” books (see Variables) had the highest likelihood (58.1%) to spend more than 30 min reading per day, while students not having reading book interest only obtained 28.4% likelihood to spend more than 30 min a day reading science book. Students interested in “gr2” books reported much lower likelihoods to spend 30 min reading science books than students interested in “gr1”, regardless of whether they take an interest in reading (43.9% among those who reported reading interest; 18.3% among those who reported no reading interest).

Table 5. Probabilities of “TimeSci” against “Readbook” and “Typebookgr”.

“TimeSci”	“g30”		“less30”	
“Readbook” “Typebookgr”	“yes”	“no”	“yes”	“no”
“gr2”	0.439	0.183	0.560	0.816
“gr1”	0.581	0.284	0.418	0.715

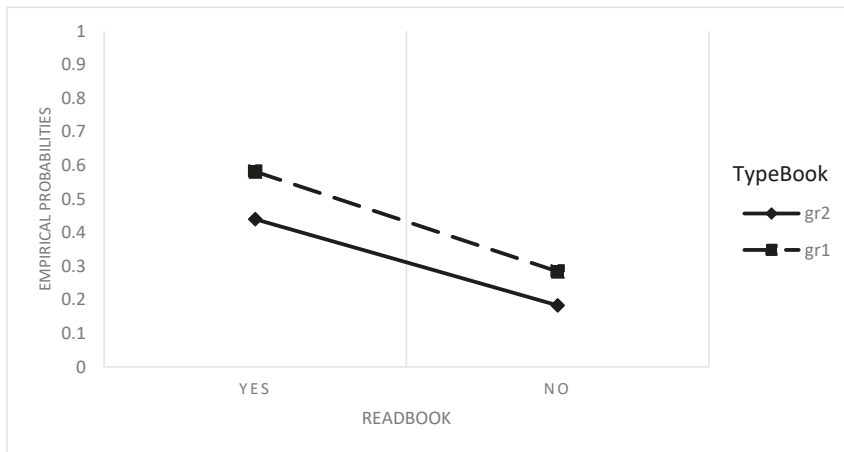


Figure 2. Probabilities of “TimeSci” = “g30” against “Readbook” and “Typebookgr”.

Figure 2 visualizes the probabilities in all four cross-tabulated categories of the two dichotomous independent variables.

Estimate coefficients from the above Table 6 were employed to calculate probabilities. The following example gave the “TimeSoc” = “g30” probability of a student who prefers Group 2 books (“Typebookgr”=“gr2”) and reportedly takes an interest in reading (“Readbook”=“yes”):

$$\ln\left(\frac{\pi_{g30}}{\pi_{less30}}\right) = -1.583 - 0.266 \times gr2 + 1.232 \times yes$$

$$\pi_{g30} = \frac{e^{-1.583-0.266 \times 1+1.232 \times 1}}{1 + e^{-1.583-0.266 \times 1+1.232 \times 1}} = 0.350$$

Table 6. Estimate results of “TimeSoc” by “Readbook” and “Topicgr”.

	Intercept	“Typebookgr” “gr2”	“Readbook” “yes”
	β_0	β_1	β_2
logit(g30 less30)	-1.583 *** [-7.099]	-0.266 * [-2.534]	1.232 *** [5.502]

Significance codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05; z-value in [square brackets]; baseline category for: “Typebookgr” = “gr1”, “Readbook” = “no”. Null deviance: 2198.9 on 1675 degrees of freedom. Residual deviance: 2152.5 on 1673 degrees of freedom. AIC: 2158.5.

As for time spent reading social sciences and humanities books, represented by “TimeSoc”, probabilities were described in Table 7 and visualized in Figure 3. Results are similar to those obtained in the prior model employing “TimeSci” as a dependent variable. More precisely students having reading book interest also acquired higher probability of spending more time reading social science books, and if their favorite type of book belonged to “gr2”, they would be less likely to spend more than 30 min reading social science books. To elaborate, the probability of students reporting to have reading book interest and be interested in “gr2” books was 35%, while that of students reporting to be interested in “gr1” was higher with 41.3%.

Table 7. Probabilities of “TimeSoc” against “Readbook” and “Typebook”.

“TimeSoc”	“g30”		“less30”	
“Readbook” “Typebookgr”	“yes”	“no”	“yes”	“no”
“gr2”	0.350	0.136	0.650	0.864
“gr1”	0.413	0.170	0.587	0.830

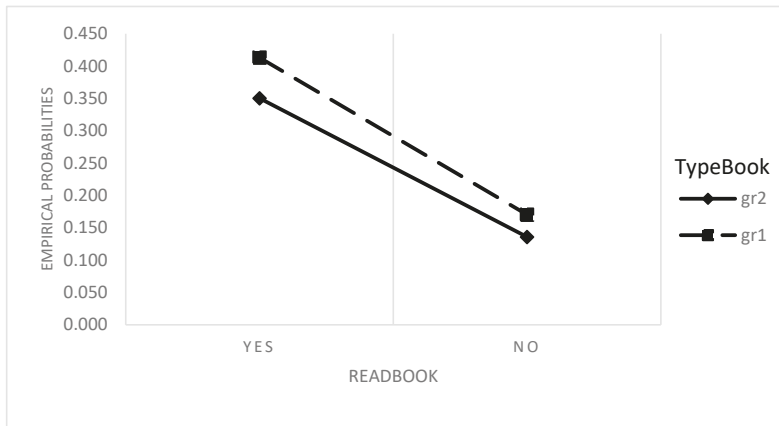


Figure 3. Probability of time reading social science books by reading interest and type of book.

3.2.3. RQ3–H3

How do reading habits and financial status of the student’s household affect students’ book sources?

Categorical logistic regression analysis was employed to estimate the sources from which students received their books. (For dependent variable “Source” which had three categories, “buy”, “borrow”, and “gift”, we selected “gift” as the base-line reference for the analysis, as shown in Table 8).

Table 8. Estimate results of “Source” by “Readbook” and “EcoStt”.

	Intercept	“Readbook”	“EcoStt”
		“yes”	“rich”
	β_0	β_1	β_2
logit(buy gift)	2.048 *** [5.297]	0.929 * [2.214]	-0.954 ** [6.475]
logit(borrow gift)	2.719 *** [7.232]	0.794 [1.941]	-1.407 *** [-3.921]

Significance codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05; t-value in [square brackets]; baseline category for: “Readbook” = “no”, “EcoStt” = “not rich”. Residual deviance: 2543.517 on 3346 degrees of freedom. Log-likelihood: -1271.758 on 3346 degrees of freedom.

All the coefficients were statistically significant with $p < 0.05$, except for β_1 of the equation of logit(borrow|gift) as dependent variable. The latter still had a p -value lower than 0.1; as such, we still considered it worthwhile for consideration in evaluating the influence of “Readbook” on logit(borrow|gift). The equations of nominal logistic regression were presented as follows:

$$\ln\left(\frac{\pi_{buy}}{\pi_{gift}}\right) = 2.048 + 0.929 \times yes - 0.954 \times rich$$

$$\ln\left(\frac{\pi_{borrow}}{\pi_{gift}}\right) = 2.719 + 0.794 \times yes - 1.407 \times rich$$

where:

$$\pi_{buy} = \frac{e^{2.048+0.929 \times 1 - 0.954 \times 1}}{1 + e^{2.048+0.929 \times 1 - 0.954 \times 1} + e^{2.719+0.794 \times 1 - 1.407 \times 1}} = 0.450$$

$$\pi_{borrow} = \frac{e^{2.719+0.794 \times 1 - 1.407 \times 1}}{1 + e^{2.048+0.929 \times 1 - 0.954 \times 1} + e^{2.719+0.794 \times 1 - 1.407 \times 1}} = 0.489$$

The probability of “Source” is presented in Table 9 and visualized in Figure 4. From the probability results in Table 9, there are several notable findings. First, economic status has a strong influence on the students’ means of obtaining books. In reportedly rich families (45% and 38.7% in case of having reading interest or not respectively), students were most likely to buy books and least likely to receive them as gifts (5.9% and 12.9% in case of having reading interest or not respectively), out of all the means of access to books listed in the survey. The same could be said about student from medium families. On the other hand, students not obtaining a wealthy background tend to borrow books with a likelihood of more than 60%.

Table 9. Probabilities of “Source” against “EcoStt” and “Readbook”.

“Source”	“buy”		“borrow”		“gift”	
“EcoStt” “Readbook”	“rich”	“not rich”	“rich”	“not rich”	“rich”	“not rich”
“yes”	0.450	0.362	0.489	0.619	0.059	0.018
“no”	0.387	0.324	0.482	0.633	0.129	0.041

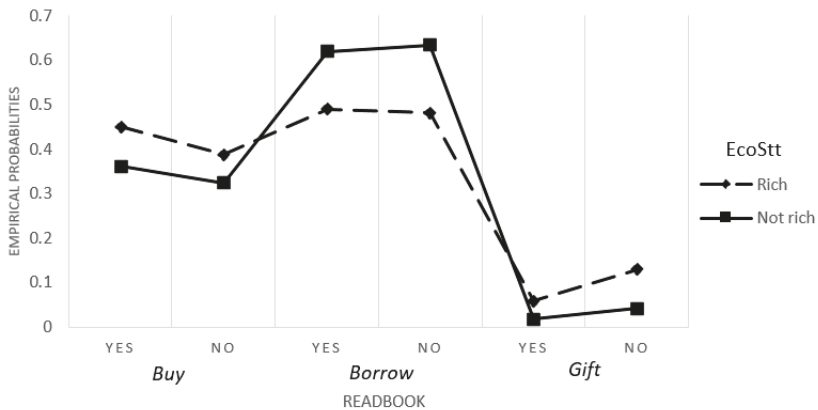


Figure 4. Probability of methods of obtaining books by reading interest and family’s economic status.

It is worth noting that the effect of reading interest is stronger in predicting means of access to books among students from medium families, compared to students from rich families. In fact, for students from a wealthy background, students who already took an interest in reading are 45% likely to buy books, whereas the probability is 38.7% for those who did not take interest in reading—the gap is 7.5 percentage points. For students from medium families, the gap is only 4.2 percentage points (between 36.2% in case of Readbook = “yes” and 32.4% in case of Readbook = “no”).

Second, there was a very small probability that students received books as gifts. Gifting books might be considered as a means to raise reading interest among students, regardless of their backgrounds. The scenario that students obtained the highest probability to received books from gifting was “rich” economic status and “no” reading book interest.

The probabilities are visualized in the following figure.

3.2.4. RQ4-H4

How do reading habits and the students' evaluation of the classroom bookcase influence the amount of time spent on reading natural sciences books and social sciences and humanities books?

The binary logistic regression analysis of dependent variable "TimeSci" against "Readbook" and "Bookcasegr" was examined and reported in Table 10.

$$\ln\left(\frac{\pi_{g30}}{\pi_{less30}}\right) = -1.254 + 0.220 \times variety + 1.263 \times yes$$

$$\pi_{g30} = \frac{e^{-1.254+0.220 \times 1+1.263 \times 1}}{1 + e^{-1.254+0.220 \times 1+1.263 \times 1}} = 0.556$$

Table 10. Estimate results of "TimeSci" by "Readbook" and "Bookcasegr".

	Intercept	"Bookcasegr"	"Readbook"
	β_0	"variety"	"yes"
	β_0	β_1	β_2
logit(g30 less30)	-1.254 *** [-6.702]	0.220 * [2.149]	1.263 *** [6.556]

Significance codes: 0 '***' 0.001 '**' 0.01 '*' 0.05; z-value in [square brackets]; baseline category for: "Bookcasegr" = "no variety", "Readbook" = "no". Null deviance: 2323.3 on 1675 degrees of freedom. Residual deviance: 2265.6 on 1673 degrees of freedom. AIC: 2271.6.

The probability of "TimeSci" by "Bookcasegr" and "Readbook" is described in Table 11 and visualized in Figure 5.

Table 11. Probabilities of "TimeSci" against "Readbook" and "Bookcasegr".

"TimeSci"	"g30"		"less30"	
"Readbook"	"yes"	"no"	"yes"	"no"
"Bookcasegr"				
"variety"	0.556	0.262	0.443	0.737
"no variety"	0.502	0.221	0.497	0.778

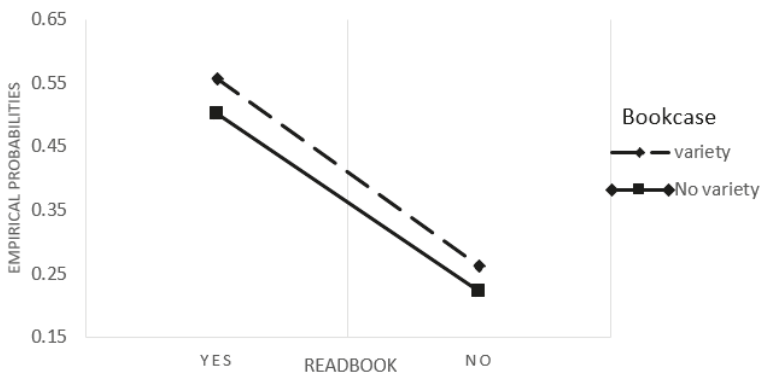


Figure 5. Probability of "TimeSci"="g30" by "Readbook" and "Bookcasegr".

The probability of spending more than 30 min per day reading natural sciences books is found to be the highest when the student takes an interest in reading ("Readbook" = "yes") and evaluated the selection of books offered by the common bookcase as varied ("Bookcase" = "variety"). It is worth

noting that reading interest drastically increases the probability of higher daily reading time (around 30 percentage points). Meanwhile, a favorable evaluation of the classroom bookcase only raises this probability by about 5 percentage points. Figure 5 below visualizes the probabilities.

How do reading habits and the students' evaluation of the classroom bookcase influence the amount of time spent on reading social sciences and humanities books?

Table 12 reported the results of the binary logistic regression analysis performed on dependent variable "TimeSoc" against "Readbook" and "Bookcasegr".

Table 12. Estimate results of "TimeSoc" by "Readbook" and "Bookcasegr".

	Intercept	"Bookcasegr" "variety"	"Readbook" "yes"
	β_0	β_1	β_2
logit(g30 less30)	-1.838 *** [-8.349]	0.448 *** [4.269]	1.198 *** [5.337]

Significance codes: 0 '***' 0.001 '**' 0.01 '*' 0.05; z-value in [square brackets]; baseline category for "Bookcasegr" = "no variety", "Readbook" = "no". Null deviance: 2198.9 on 1675 degrees of freedom. Residual deviance: 2140.8 on 1673 degrees of freedom AIC: 2146.8.

The regression analysis can also be expressed by the following equation:

$$\ln\left(\frac{\pi_{g30}}{\pi_{less30}}\right) = -1.838 + 0.448 \times variety + 1.198 \times yes$$

where:

$$\pi_{g30} = \frac{e^{-1.838+0.448 \times 1+1.198 \times 1}}{1 + e^{-1.838+0.448 \times 1+1.198 \times 1}} = 0.452$$

The probability of "TimeSoc" by "Bookcasegr" and "Readbook" is described in Table 13 and visualized in Figure 6.

Table 13. Probabilities of "TimeSoc" against "Readbook" and "Bookcase".

"TimeSoc"	"g30"		"less30"	
"Readbook" "Bookcasegr" "variety"	"yes"	"no"	"yes"	"no"
"no variety"	0.452	0.199	0.548	0.801
	0.345	0.137	0.655	0.863

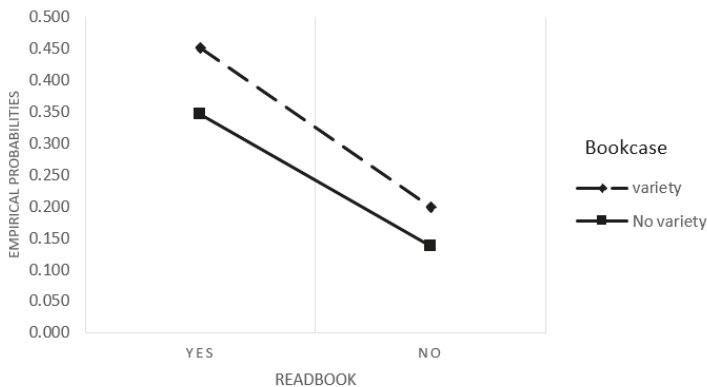


Figure 6. Probability of time reading social science books by reading interest and type of classroom's bookcase.

The regression analysis yielded on “TimeSoc” similar results to the previous model. Students, who had an interest in reading and who considered their classroom bookcase as having a considerable variety of books, were the most likely to spend more than 30 min a day reading social sciences and humanities books (45.2%). The likelihood is 34.5% for those who also reported positive reading interest but evaluated the classroom bookcase as unvaried. On the other hand, these probabilities were 19.9% and 13.7% students who answered no to “Readbook”, and considered their classroom bookcase to be diverse and not diverse, respectively.

3.2.5. RQ5–H5

Do the presence of an occupational aspiration and the level of education of parents affect student’s 45-min tests of math, physics and chemistry?

We conducted a regression analysis (general linear model) with the dependent variable “APS45” against three independent variables: “FutureJob”, “EduFat” and “EduMot”. Table 14 presented that all coefficients are statistically significant with $p < 0.05$.

Table 14. Estimate results of “APS45” by “FutureJob”, “EduFat”, and “EduMot”.

	Intercept	“FutureJob”	“EduFat”	“EduMot”
		“Define”	“Uni”	“Uni”
	β_0	β_1	β_2	β_3
“APS45”	6.605 *** [46.790]	0.337 * [2.325]	0.306 * [1.973]	0.721 *** [5.586]

Significance codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05; t-value in [square brackets]; baseline category for: “FutureJob” = “Define”, “EduFat” = “EduMot” = “Uni”. Null deviance: 2392.2 on 1400 degrees of freedom. Residual deviance: 2270.0 on 1397 degrees of freedom. AIC: 4662.

The regression analysis results can also be expressed in equation form as follows:

$$APS45 = 6.605 + 0.337 \times Define + 0.306 \times Uni_{EduFat} + 0.721 \times Uni_{EduMot}$$

It was found that the presence of an existing occupational aspirations and university-level (or above) education of parents have an enhancing effect on academic achievement. Among three variables, the education level of the mother was the most impactful factor on the score.

4. Discussion

4.1. Reading Interest, Favorite Books and Time Spent Reading

A vast body of literature has reaffirmed the role of reading on students’ process of learning since reading practices help foster students’ skills such as talking, thinking, interacting, valuing and believing as well as their ability to expand perceived knowledge about nature and society [110,111]. Students in different grades must step by step learn to perceive the world by reading books which are mainly categorized as natural science books and social sciences-humanities books and students are more likely to read natural science books once they need to seek supplementary knowledge in the field besides their teacher—created lessons. Study results at school in turn motivate students to accumulate knowledge and skills through reading books. Therefore, cultivating reading interest of students is tantamount to students’ academic success.

Reading interest of Vietnamese secondary students varies by school grades. 6th grade students are reportedly more likely to be interested in reading books than older students. One of the possible reasons might be that students in higher grades had less time to spend on reading. The more demanding curriculum in higher school grades puts more pressure on students, which takes away time from leisure reading. This is particularly true for students in 9th grade, who usually have to prioritize preparations for the national high school entrance exams [107].

Regarding the correlation between reading interest and academic achievements, our results showed that students who are interested in reading books average higher score of 45-min tests of Math, Physics, Chemistry and Biology (APS45) compared with those who reportedly take no interest in reading. Our finding is in line with the study of Whitten et al. [112] in that there is the close link between pleasure reading and academic success of high school juniors at a rural Southeast Texas high school. Because reading is the fundamental process of learning and getting knowledge [6], the evaluation process through test scores reflects students' ability to perceive intellectual treasure of the mankind.

Naturally, each student is apt to choose favorite books to read when he or she is aware that a type of books provides them with supplementary knowledge which in turn help improve study results of students at school. In the study, we found that student choosing maths, science, chemistry and biology books acquired higher score in scientific subjects than student choosing social science topic. This result supports the finding of Zhihui Fang that students reading more science books are more likely to perform better in science subjects than their peers [42]. The association between being interested in natural sciences books and scoring higher in natural sciences subjects should not come as a surprise. As such, when planning initiatives to develop skills in STEM-related school subjects among students, one should take into consideration not only hands-on activities but also book reading on STEM topics, to enhance the positive effects.

Interesting findings of the influence of time spent on studying and working on academic performance of students are that time spent on working has not had direct impact on college students' semester grade point average (SGPA) whereas the interaction between ATC composite score and time spent working significantly influences students' academic achievement [113]. Nonetheless, a big gap in the literature on the association between the amount of time spent on reading and students' academic success should be filled up. One important point to note is that our findings showed positive and insignificant association between the amount of time spent on reading books and students' academic success. As such, the amount of time spent reading—be them natural sciences or social sciences and humanities books—might not be the determinant of academic performance. This could suggest that intensive reading habits do not necessarily translate to immediate and measurable results in school. Whether it is a matter of the schooling system and its evaluation criteria could constitute a subject for future research.

Our data shows that, 6th grade students tend to spend more time on reading natural science books than the others probably because younger students are under less pressure from schoolwork; therefore reading time gives them more pleasure. On the contrary, most of the 9th grade students spend less than 30 min per day reading social science books. Social science books take more time to read compared with their counterparts and the 9th grade students spend most of their time on studying as their top priority therefore spending less time on reading social science books [96]. Interestingly, favorite types of book determine the larger amount of time spent on reading such books. This implies that a personal interest for such types of book may increase students' energy thus making them more relaxed even with more time spent reading. The question that remains hangs on how this interest forms for individual students.

4.2. Family Socioeconomic Status

Socioeconomic background and its relationship with educational achievement of students is one of the enduring issues in educational research [114]. Some researcher argue that students' academic success is positively influenced by the financial condition of their family. It is true that, wealthier parents are able to invest more in education of their sons. Rich parents in many cases spend money on students' learning resources such as books, educational games, laptop as well as on extracurricular courses [115,116].

In our paper, we investigated the association between students' family socioeconomic status and source of book supply. Students in rich families were more likely to buy books and receive them as gifts than students of the other two categories of SES, regardless of reading interest. In addition, students who do not come from a wealthy background are more likely to borrow. The finding implies

that students with a more favorable financial background are willing to spend their own money to buy books whereas students in not rich families still obtain books to read by borrowing, perhaps, due to the economic constraints and the shortage of bookstores in the neighborhood [63,64].

This finding is in line with a study on fifteen-year-old students in 9th grade from rural areas of five provinces in western China [117], according to which there exists a positive correlation between the students' family SES index and academic performance. The vital role of family SES on student's academic outcomes is reinforced in a range of educational research [77,118,119]. It is worth noting that family SES has been shown to have a strong correlation with language achievement, more so than in science/math and in general achievement [118]. Additionally, the same study also pointed out that the positive correlation between family SES and academic performance is not always consistent. Nevertheless, our paper contributes further evidence for the relationship between socioeconomic conditions of the household and the student's performance in STEM-related subjects. Students growing in rich families are better financially supported and oftentimes do not have to spend time on chores or helping their parents generate income (farming, small retail businesses, etc.), thus having more time on their study at school as well as to read [56,73].

It should also be noted that book interest is a significant predictor in obtaining books. In fact, as shown in the data, when in a wealthy family, students who reported no interest in reading are much less likely to purchase books than those who did. When compared to the likelihood of borrowing books and receiving books as gift, the probability of buying books is the most drastically affected by reading interest. This suggests that even among richer families, there is still a certain reticence to spend money on books, and an intrinsic motivation—personal interest in reading books—could cancel out this reluctance.

4.3. The Role of the Classroom Bookcase

We were also concerned about the evaluation of students on the public bookshelves of the classroom. Although, student should focus on genre of books to read, their reading interest may be negatively influenced once they feel uncomfortable to spend more time on reading books in their classroom. A diverse bookcase would be more exciting and might inspire students spend more time to read. As explained above, reading interest is tantamount to getting deeper knowledge and achieving better academic outcomes. Therefore, a bookcase with diverse books that appeals to varied interests in terms of topics would encourage students to spend more time on reading. Our regression results favor the idea that a bookcase with various types of books could increase the likelihood that students spend over 30 min per day for reading. In addition, it could once again be observed that while the effect of a satisfactory variety in the common bookcase enhanced the student's reading intensity in terms of duration, the most noticeable effects remained those of reading interest. This result complements the findings that the increase in reading resources improves the reading skills and children's attitudes towards reading [56,74,86]. As reading interest has been shown to be linked to personal preferences such as favorite leisure activities [107], diversifying both the classroom bookcase and the type of reading promotion activities would perhaps be a proposition worth considering. More focus on creating an encouraging reading environment, such as providing access to a wider variation of books in this case, would inspire students to read at higher intensity.

4.4. Occupational Aspiration and Parental Education

The question of whether or not having career orientation at the early stage of schooling helps improve the academic performance of students remains unclosed till today. In the literature of educational research, no examination is conducted with the correlation between career orientation of students and their academic performance. Most students participating in our survey reveal a concrete idea when asked about their dream future job. Only a small number of students do not think about their future career. We might think that job definition in the early stage of schooling motivates students to learn better therefore achieving academic outcomes. We have found a positive correlation between

“future job” and the average score of students’ 45-min tests of math, physics, chemistry and biology. Evidence showed that students who define their job in the future are more likely to achieve better academic performance than those who have no career orientation, which is somewhat in line with the result found among 12th grade students in the US [97].

The role of parental involvement on the academic achievement of minority children is indicated in [120]. A family with higher education parents is aware of the benefits of reading and they tend to provide their children with more chance to read [90]. Our study revealed an evidence that the education level of fathers and mothers in families is significantly and positively associated with their children’s academic outcome at schools. Most of students who were born and raised by highly educated parents ever experience knowledge and guidance from their families at their young ages [92,93]. Further, highly qualified parents are more likely to have better orientation for their children because they actually know what are good or not good thus giving good advice for the study of their children [94]. In the same vein, parents can act as professional instructors since high level of education comes with wisdom, parents help their children achieve academic success.

It should be worth noting that there seems to be a stronger involvement of the mother in the child’s academic performance; as evidenced by estimate coefficients $\beta_{EduMot} = 0.721$ of mothers versus $\beta_{EduFat} = 0.306$ of fathers, when they have finished university or up. This might or might not be counter-intuitive to the reader, as certain cultures perhaps view the father more likely to assume the role of the educator. In the case of the Vietnamese household, however, this results seem to be in line with the traditional disparity in child-rearing roles between the mother and the father. Moreover, this finding might be explained that by the fact that, compared to fathers, mothers play a more important role in forming children’s reading habits at home since they spend more time on reading, teaching and are more frequently the one to encourage their children to read [57,91]. As the study has been conducted on adolescents aged 11 to 15, considered “young”, their education more often fall under the domain of the mother, in conventional views. As such, the notable difference in influence between the two parent here suggests a still-present division of responsibility. Literacy promotion initiatives should take into account this difference, both to enhance the effectivity of reading promotion activities and to tackle this gender gap in child education.

5. Conclusions

The article investigated the association between Vietnamese students’ STEM-related academic achievement and their reading interest, living condition, parental education, and their aspiration for future career. Reading interest, a defined occupational aspiration, the education level of the mother are predictors of students’ higher score in STEM-related subject, namely Math, Physics, Chemistry and Biology. Regarding the types of books, students who read natural sciences books achieved higher academic results than students who preferred other topics. Reading interest also predicts the book purchasing behavior of the students, even in a wealthy family.

Vietnam is aiming to achieve United Nations’ Sustainable Development Goal by 2030, with one of the top priorities is ensuring the goal of SDG 4, which aims for inclusive, equitable and quality education and for promoting lifelong learning opportunities for all [121,122]. In order to achieve this goal, STEM education is being considered as a practical and holistic education approach [123,124]. The research results provide educational policy makers in Vietnam strong empirical evidences regarding reading interest and STEM education of Vietnamese students [125]. The effect of reading topic-specific books materializes into students’ academic achievement, as our results suggested. Thus, fostering the interest for reading in students should be the focus of school’s curriculum or education policy. The government and the school in Vietnam can do this by designing a more reading-friendly environment and allowing students more time to read, as these were suggested to correlate with higher academic achievement. Finally, the involvement of student’s family is crucial to fostering reading interest and improving student academic achievement, especially the role of the mother.

Despite the contribution to education policy in Vietnam, this study is still subjected to certain limitations. Firstly, the study was conducted in a Northern city in Vietnam, thus any generalization to wider population must be cautious. Secondly, the study employed the frequentist methods, which still have weaknesses such as the definition of statistical significance [126]; thus, replications or further studies can use different approaches such as qualitative technique, which would help triangulate the quantitative data analysis, or Bayesian statistics, which strength lies in the ability to update probability with new arising evidences [127].

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Article

The Relationship between Birth Order, Sex, Home Scholarly Culture and Youths' Reading Practices in Promoting Lifelong Learning for Sustainable Development in Vietnam

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Abstract: Book reading is an important factor contributing to children's cognitive development and education for sustainable development. However, in a developing country like Vietnam, statistics have reported a low figure in book reading: only 1.2 books a year. This research study used a dataset of 1676 observations of junior high school students from Northern Vietnam to explore students' reading behavior and its association with demographic factors, and the family's reading culture. Data analysis suggests the older the student gets, the less inclined they are to read, and being female and having hobbies of low sensory stimulation are linked to higher preference for reading. Regarding scholarly culture at home, students who read more varied types of books and spend more time on books are correlated with higher reading interest. Reading habits are also positively reinforced by the capacity to access books and parental book reading.

Keywords: reading practices; reading abilities; junior high school students; sustainable education; education for sustainable developments; gender; Vietnam

1. Introduction

1.1. A Brief Overview

"You don't have to burn books to destroy a culture. Just get people to stop reading them"

—Ray Bradbury

Humankind has always concerned itself with preserving what they have learned and created and passing it down to the next generations. As the printing press facilitated the production of written materials, oral traditions gave way to books as the dominant medium of recording human knowledge. Even cultures that to this day rely more on word-of-mouth would perhaps benefit from being documented in written forms. Reading books, though not the only means, is therefore crucial in the process of gaining knowledge (see Figure 1). Maintaining appreciation for book reading has become essential in nurturing and sustaining cultures.



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Figure 1. Readers give it a caption! (© 2019 Illustration courtesy of Ha-My Vuong).

Reading is the fundamental process of learning that helps stimulate social awareness and critical reflection. In this sense, building a literate and learning society is prerequisite to innovation initiatives and social change. Literacy achievement is, therefore, widely recognized as a key indicator of a developed nation. Particularly, in the Sustainable Development Goals (SDGs), the United Nations has considered the acquisition of necessary knowledge and skills for sustainable development as the target 4.7 of the goal for Quality Education [1]. Since the ultimate goal of education in today's world is no longer to transmit knowledge and information but to foster learner autonomy and lifelong learning, reading, as one of the most basic methods to expand knowledge and understanding, is of great concern. Research has confirmed the crucial role of reading that expands beyond enhanced literacy outcomes to various cognitive capabilities [2]. In addition, reading as early academic skills has also been linked with better academic achievement, educational and occupational attainment in young adulthood [3,4]. Learners' interest and proficiency in reading as well as their reading practices are one of the main focuses of a modern and sustainable education system.

As today's technology-driven world is shifting toward a new era of computational power, and computational entrepreneurship [5], literacy is also emphasized as a key skill in aiding 21st century learners' acquisition of digitized information. When examining the relationship between scholarly culture from childhood and adulthood information and communication technology (ICT) skills, Evans, Kelley, Sikora and Treiman [4] found that developing a reading culture at home is associated with better technological problem solving skills. The benefits of reading have also been confirmed in Sciences, Technology, Engineering and Mathematics (STEM) education domains since the practice of

reading helps formulate new ideas and inquiries for the problem solving processes involved in STEM learning [6]. As a result, youth's reading practices are among one of the key focuses of education in order to develop human capital, lift labor productivity and promote sustainable development in the age of information.

However, in developing countries like Vietnam, sustainability is difficult to achieve due to a lack of knowledge, skills, and awareness of global issues in ordinary citizens. This partly results from the absence of a promoted reading culture in the country. According to statistics from [Dammio.com](#) [7], 70 million Vietnamese people own a mobile phone, and around 64 million people are Internet users. An average Vietnamese spends up to 11 h a day for Internet, social media, and consuming contents, which include TV, video, and music. Vietnamese people have, in fact, become more and more comfortable with the omnipresence of technology in their life, so much so that even old habits seem to be gradually replaced. Statistics from Vietnam Ministry of Education and Training and Room to Read reported a Vietnamese person reads only 1.2 books per year [8]; including textbooks, the number rose up to four books per year, according to the Vietnam Publishers Association [9]. Strangely, the publishing industry was having a good year with around 20,000 titles in 2018; moreover, a bookstore system also had a 15–20% rise in revenue [9]. In education, reading culture does not seem to affect the achievement of Vietnamese students, especially in science and mathematics. The evaluation of Vietnamese students via the Programme for International Student Assessment (PISA) test shows high scores in these two areas. In the Science test, Vietnam was ranked 7th out of 65 countries in 2012 and 8th out of 72 countries in 2015. In the Mathematics test, Vietnam scored better than the international average in both years. However, when it comes to Reading, Vietnam declined from rank 15 in 2012 (Score 511) to rank 32 in 2015 (Score 495). A comprehensive understanding of the influencing factors of reading practices is substantial for fostering sound and scientific policies that will result in educational sustainability.

According to a recent study, reading interest and high school students are not well researched by researchers in Vietnam: only 19 out of 174 articles of Vietnamese researchers that were indexed in Web of Sciences are about general education [10]. Thus, based on a comprehensive dataset of 1676 records of Vietnamese junior high school students, students' demographic information and family background were taken into consideration with their book reading habits. This research aims to address the need to study the reading habits of Vietnamese youths in order to promote lifelong learning skills, provide grounded evidence for educational policy in Vietnam [11,12], and improve equity in education and science [13–15].

1.2. Literature Review

There have been many attempts at conceptualizing the act of reading, evidenced by the number of fragmented reading theories in cognitive science [16]. The works of Carver theorized reading and comprehension based on generalizations on thought communication and coined the notion of “rauding” as a more general process of language comprehension, of which reading was a special case [17]. The simple view of reading defined the process of reading as a product of decoding (as in word recognition) and linguistic comprehension [18,19]. According to this approach, the act of reading could not be achieved with either component missing, and when they are both present, they have equal potentials of contributing to the output of the reading process. In more concrete terms, it means that knowing a language (linguistic comprehension) does not guarantee literacy in said language: for example, children who have not learned the alphabet nor how to spell would not be able to decode written words, therefore unable to read. Vice versa, knowing an alphabet or even the orthography of a language (decoding skill) does not mean one could understand a text written in said language, without the necessary comprehension skills (vocabulary, grammar, etc.).

Two main problematic aspects arise from the usage of decoding and language comprehension as the main components to define reading. On the one hand, the purest measure of decoding relates to spelling-sound correspondence, which would make it complicated to define literacy in the case of disability. On the other hand, this definition puts language on center stage and begs the question as to

how research on reading ability in various languages around the world could have a coherent common frame, especially in terms of measuring linguistic comprehension. In fact, it could be noted that while there is an extensive literature on the subject of reading, the majority of them are limited to reading in the English language. Linguistic skills aside, this also implies a prevalence of Anglosphere-based studies, with all of its implicit cultural assumptions. Taking this into consideration is not only crucial in reviewing the literature, but also in assessing the contribution of our paper, which is based exclusively on the Vietnamese language. That being said, the simple view of reading remained crucial in the literature on reading and cognitive skills; most of its critics also attempted to build up from it or merge it with existing theories [20]. Ouellette and Beers, for example, still based their hypotheses on the model of the “simple view” while suggesting more complex constructs under the two main components, and the importance of oral vocabulary in reinforcing both word recognition skills and listening comprehension [21].

Regardless of the theorized models, it had consistently been proven that reading contributed positively to cognitive development and literacy skills, particularly that of children [22–24]. A large body of literature pointed to a decline in reading practices along with age in the United States, in the general adult population (aged 20 and up) [25] but also among undergraduate students [26] as well as elementary (Grade 1 through 6) pupils [27]. The same phenomenon could be observed among primary and secondary school pupils (mainly aged 6–16) in England [28]. Anderson, et al. [29] showed that secondary school students have less interest in reading than elementary students. Panel data individually following 164 middle school students (from sixth to eighth grade) in the US over a 3-year time period have indicated a decline in voluntary reading despite their purposes for reading remaining stable [30]. On the other hand, despite the development of multimedia mediums and other sources of information such as the Internet, generational shifts in reading frequency did not seem to have a negative effect on reading. In fact, longitudinal data on a large scale suggested that the generational shifts in reading frequency is not absolute and could be conditional on reading materials in terms of genres (magazine, newspaper, literature, etc.) and on the physical medium of reading (physical or digital copy). Specifically, Robinson [25] addressed this matter with an optimistic outlook for reading as an equal to other media (television, for instance) in terms of consumption, while specifying the shift in reading material preference—a decline in newspaper and increase in books and magazines—in the American adult population. Shahrizia Abdul Karim and Hasan [31] studied a sample of Malaysian college/university students (aged 19–22) and pointed out the fact that students maintained their reading practices, and only changed their media from physical books to websites. While this observable shift in reading media was considered inconsequential for college-age students, it might not be the case for readers of all age ranges. It has been shown that the presence of electronic features in reading materials can diminish the positive effect of parent-child storybook reading on literacy skills development among children [32].

Another focus in the literature on reading practices was its relationship with regards to reading enjoyment. There has been extensive documentation on the decline of reading enjoyment with age, particularly in students. Clark and Foster [28] reported that elementary pupils both enjoyed reading more and rated their reading proficiency higher than their secondary counterparts. Ley, Schaar and Dismukes [30] pointed out the significant relationship between reading attitude and reading behavior of students, which both declined throughout junior high school regardless of gender, race, or socioeconomic status. The majority of students prioritized utilitarian values of reading, suggesting that extrinsic motivations, such as to seek certain information for a specific purpose or to complete a class assignment, were more instrumental in leading students to read. This was further confirmed by later studies in other countries, such as that of Majid and Tan on schoolchildren (aged 9–12) in Singapore [33]. However, Guthrie, et al. [34] reported the important role of intrinsic motivations as well as situational interest in certain books in increasing long-term reading practices. In addition, the motivations for reading and by extension the level of enjoyment derived from reading may vary on an individual basis in relation to personal preferences regarding the type of books [34,35]. Finally,

for college students, leisure book reading, while still valued, was less prioritized than other forms of entertainment (watching television or chatting with friends over text messages) [26]. One of the reasons was that they had already read a lot for school, which may suggest that obligatory reading could influence the level of reading enjoyment in general. Recently, researchers have discussed the lack of sciences and philosophy books for children, and Pigliucci [36] called for attention in this matter.

Gender has also been examined in relation to reading patterns and practices. Research studies in both Western and Eastern societies have shown that males and females are often reported to differ significantly in reading enjoyment, motivation, and reading material preferences [28,31,33,37,38]. Most of these results show that girls read more and are more interested in reading than boys; however, findings based on data from 12 to 15 years old Australian students suggested otherwise [39]. In terms of race, Asians were slightly better at reading reports, while Whites found reading newspapers and novels easier [40]. A recent research article showed that third grade elementary school female students demonstrated similar reading ability as their male counterparts, but they valued reading more [41].

Children's reading practices and the forming thereof often involve the home as much as they are associated with the school. Clark and Foster [28] found that students in England generally agree that both family and school should teach and motivate children to read. In fact, numerous works in the literature have pointed out the positive role of dialogic parent-child storybook reading in developing child literacy [42,43]; this applies to natives of languages other than English as well [44]. Palani [45] suggested parental guidance as one of the measures to develop reading interest. Ennemoser and Schneider [46] used parent's reading for children as a substitute for exposure to reading materials in kindergarten children. This methodological choice suggests the crucial role of parental guidance in cultivating an interest in reading for children in their early formative years, especially when they have not yet learned to read. In England, pupils also reported their parents as being their most important reading partners and source of influence in regards to reading practices [28]. But parent-child interactions were not the only element to be taken into account, regarding book reading and reading competency development in the home. In some cases, merely having access to books at home during childhood already improved cognitive ability of children [22]. Other studies have also shown that dialogic parent-child reading might not always bring the expected results of child reading achievements [47]. Regarding other attributes related to the household, Clark and Foster [28] reported that pupils who are eligible for free school meals, implying a background of lower socio-economic status, are less enthusiastic readers; their parents also read less or own fewer books. Compton-Lilly [48] had, based on longitudinal data obtained through an 8-year long qualitative study of an African-American family, gained insights into the role of familial and socioeconomic context on forming children's discourse and literacy: namely, that the language used in the family, the economic situation of the family and the manner in which family members discussed literacy contributed into shaping the child's book choices and enjoyment of school texts.

Related to family literacy is parent-child reading activities, and, by extension, parental attention and reading habits in children. In effect, the inverse relationship between family size and birth order on the one hand and childrearing quality on the other has been documented in the literature [49–53]. One of the theories most often drawn upon is the resource dilution model, relating parental resource to child quality. Assuming that parental resource—both material (access to books and other forms of education) and financial (support for college tuition, for example) as well as in terms of parent-child interaction—is limited, it would have to be divided between siblings. It follows that the larger the family size, the less parental resource each child would receive on average; this has been evidenced by numerous studies [49,50,52]. In terms of accumulated parental resource since the birth of a child, the firstborn would receive the most attention, because there would be a period of time during which they enjoy undivided attention from their parents, in the absence of siblings, while the opposite could be said for the youngest child in the family who would have been born into a comparatively lower average share of parental resource. It could then be the case that in theory, the more older siblings a child has, the less they receive from their parents relatively, whether it be the resource on average at a

point in time, or the cumulative investment throughout their formative years [54]. Evidence for this negative effect of higher birth order (meaning, having more older siblings) on children can be found in work by Black, Devereux and Salvanes [50], who have also pointed out that the negative effect applies regardless of the socioeconomic status of the household; although studies such as Steelman and Powell [53] suggested minor financial advantage later in life among younger siblings.

As has been mentioned above, alongside the development of technology was the shift in reading materials and media. For instance, web-based educational platforms are expected by the teachers to be the new way for students to learn [55]. The optimistic outlook for books as seen in Robinson [25] could, however, be put back into perspective, as other forms of information dissemination and entertainment had the potential to dwarf written mediums. Mokhtari, Reichard and Gardner [26] found that Internet activities do not seem to interfere with reading practices, whereas watching TV is a popular activity but not as enjoyed as the Internet. They also showed concerns for students' habit of "multitasking," which often combines reading with listening to music or watching TV and the efficiency of such activities. The study highlighted the lack of time in student life and overlap of activities. The subsequent question to reading practices would perhaps be reading ability. Findings in Ennemoser and Schneider [46] based on the data from 332 German children collected from 1998 to 2001, suggested that TV viewing had at least a medium-term effect on reading ability (three-year gap), especially at an early age. It should also be noted that the genre of the TV program also mattered in assessing the influence of TV consumption: more specifically, the effects of consumption of entertainment-general audience programs tend to support the inhibition theory (basically, that children read less as they watch more TV), as opposed to educational programs that might enhance reading practices. Compton-Lilly [56] further suggested that teachers can observe how video games engage children to find out good ways to teach children how to read. Multimedia consumption can thus, to an extent, be analog to reading practices and the formation of reading habits in children.

But children and adolescents do not only either read books or watch television. In fact, pastimes other than book readings have existed long before the birth of the screens, and there is a plurality of hobbies so complex that many classifications have been constructed for them, such as the Holland's RIASEC (Realistic, Investigative, Artistic, Social, Enterprising, and Conventional) model [57,58]. We have touched upon reading enjoyment, so of course, it would only be natural to look at leisure reading not only about obligatory reading but also to other potential leisure activities. The question is, which factors relating to leisure activities would be relevant in the context of determining reading practices?

Profiling leisure interests is not a simple task, especially where it concerns adolescents. While frameworks, such as the RIASEC model, have attempted to categorize leisure interests, most of these are related to professional capacity and/or opportunity, thus more fitting for adults. For adolescents, there are no dominant methods of categorizing leisure activities. Garton and Pratt [59] group 73 leisure activities into six groups, namely: Sport, Gregarious, Water sports, Serious, Indoor games, and other activities. Fitzgerald, et al. [60] devised two sets of activity categories. The first set is applicable for measuring participation and consists of Sports, Outdoors activities, Keep fit, Non-sports, Entertainment, Computer/Friends, the other for interest (Outdoors activities, Entertainment, Sports, Social activities, Hobbies, Others).

Leisure activities are highly related to personal interests, as evidenced by strong correlations between interest and level of participation in an activity [59,60]. Through the analysis of English schoolboys test results, Hudson [61] made the distinction between two personality profiles among male pupils: "convergers", who score higher on technical topics but poorly on open questions; and "divergers," who are the opposite. The paper suggests that converger-type boys are more likely to restrict themselves to impersonal, technical topics so as to avoid open-ended discussions, controversies, and matters deeply involving humans and feelings. This study, however, only provides a correlation between personality and interest rather than a relationship between these two factors; it is also only limited to male pupils. It has been found that personal interest plays an important role in determining the level of participation [59,60]. In the recent years, however, there has been evidence to suggest

that external factors and environmental change also play a role in determining activity preference among children and adolescents [62,63], in terms of both intensity and content of the activity. There is, notably, a global shift towards more passive activities such as TV watching, and away from free-play and experiential learning, regardless of the child's gender or the family's socioeconomic status.

There is evidence to suggest a stark interest-based difference of hobby choice between adolescent boys and girls. Sex is, in fact, an important predictor for the level of both interest and participation in leisure activities [59,60]. It would be impossible to draw a clear line of distinction between what constitutes strictly masculine or strictly feminine interests. However, there have been many attempts at generalizing sex-based differences in occupational and/or leisure interests between males and females, based on a general consensus that such a distinction does exist, either between organic and inorganic things. One well-known example would be Things versus People distinction, conceptualized as a dimension of Holland's RIASEC model of occupational interest, which has been employed in representing leisure [64] as well as in investigating sex-based differences in interests [65].

It has already been mentioned above that female and male reading practices differ. However, little has been said directly about the link between female and male interests in general and their practicing of reading (in terms of both content and quantity). Thus, this paper aims to bridge the gap by studying the role of sex-based differential interests as an indicating factor of reading practices.

While the literature mentioned in the above paragraphs pertain largely either to reading in the context of learning or to reading among students, it should nonetheless be noted that reading is not inherent to learning and vice versa. The goal of reading is not limited to being purely utilitarian or based on knowledge-gaining. In the conceptual framework of this survey, however, we aimed to study the activity of reading in specific relations with education and future occupational aspirations, hence the focus on measurable cognitive and competence-wise benefits of literacy. In addition, it should be noted that despite our study being anchored on print-based literacy, we are aware of the wealth of literacies beyond the exposure to and absorption of information in textual form [66]. By linking reading skills to pedagogy and the sustainable development of the education system in our country, we are by no means claiming that print literacy is the only measure of academic success or cognitive development. It is in fact a construct pertaining to the school of development, which to this day remains the dominant model yet not without facing staunch criticism [67,68]. Print-based literacy did in fact emanate from urban and industrialized societies, therefore favoring those over rural and agrarian ones. It is crucial to acknowledge this in order not to undermine communities in which other forms of literacies and wisdoms prevail, especially in the quest for and the preservation of more sustainable ways of transferring knowledge and of living [69].

1.3. Notions and Concepts

In this study, we intended to keep the concept of reading as encompassing and open to interpretation as possible, as the subjects of the research are junior high students from grade 6 to 9, which in most cases correspond to the age range from 11 to 15. Respondents are allowed to apply their intuitive understanding of the term "reading", with only minimal instruction in order to assure a global coherence between filled records. The activity could thus be understood as meaningful exposure to texts that are not necessarily intensive. This means that leisure reading is included and there is little limit on the reading material and subject. Comic books, for example, were not excluded, and with good reasons: we consider the ability to relate visual representations with textual information—albeit of shorter length—and to process both simultaneously just as appreciable as simple reading skills of more word-dense texts. This open understanding of reading also means that any reading medium, i.e., paper-based, digital, etc. could be included.

In addition, several recurring terms related to reading necessitate a consistent understanding. First, the term "reading interest", and denotes the student's proclaimed interest in the activity of reading. More specifically, in the original questionnaire, we posed the question "Do you like to read?". Students were given the option to answer either "yes" or "no". As all self-reported measures go,

we acknowledge that this answer might be under the effect of social desirability and would reflect with varying extents of accuracy the student's true attitude regarding the activity. For this reason, we focused on the differing behaviors and habits between students who answered "yes" and those who answered "no". This notion corresponds to the variable "Readbook".

Second, the terms "reading habits" and "reading practices", in the context of this paper, were used interchangeably and refer exclusively to the amount of time spent reading daily. It measures student behaviors regarding the activity, to an extent, and were thus used as inputs to examine how already formed habits affect the likelihood that they show an interest in reading. There is the underlying assumption that people, in their formative years, depend on outside influences to form the habit of engaging in literary activities—as has been mentioned in the literature concerning family literacy. Although this measure is also self-reported, it seems to be less under the effect of social desirability, as respondents did not hesitate to report the lowest amount of time per day spent reading either type of books. The corresponding variables are "TimeSoc" and "TimeSci", which measures the time students spend reading social sciences and humanities books and natural sciences books, respectively (see Appendix A, Table A1).

Regarding external factors relating to the students' habits, i.e., family and school, we have decided to focus on how the family environment is linked to the reading interest among students. Two types of reading encouragement were examined: passive encouragement, indicated by the provision of books by the parents; and active encouragement, indicated by parental accompaniment in the form of reading books out loud for their children. The corresponding variables are "Buybook" and "Readstory". The exact wording for the questions (translated into English) are, "Do your parents buy books for you?" and "Do your parents read you stories?", respectively. The answer "yes" denotes that the event mentioned in the question has occurred at least once; conversely, the answer "no" means that the event has never occurred.

It follows that both "Buybook" and "Readstory" are dichotomous variables, which might seem overly reductive, for an act as fluid in intensity and as varied in forms as that of encouraging a child to read. In fact, the variables have been designed in accordance with the cultural and socioeconomic feature of our developing country. In many provinces of Vietnam, that are more often rural than not, books are a luxury. Finance aside, it is also not common in the Vietnamese society for parents to personally select books for their children or to read for their children. For these reasons, an overly detailed variable in this aspect would only create unnecessary confusion for the instructors and students to answer adequately, especially given the cultural context previously explained.

1.4. Research Questions and Hypotheses

This study aims to explore the relationship between demographic and socioeconomic factors with interest in reading books, as well as how personal habits regarding hobbies and book reading relate to self-reported interest for reading. Based on this, the following questions were formulated:

- RQ1 What is the association between age, school grade, birth order, and reading interest?
- RQ2 How does home literacy interact with the student's own reading interest?
- RQ3 How do pastime activities influence reading interest? How does this factor interact with gender?
- RQ4 How do books of different genres and the amount of time spent reading them relate to reading interest among students?

The hypotheses corresponding to these questions are as follows:

- H1 Birth order and grade in school is negatively correlated with the propensity of taking an interest in reading.
- H2 Students whose parents buy books for them and/or read stories out loud for them are more likely to take an interest in reading, compared to others.
- H3 Preference for activities that require more introspection would be positively associated with reading interest regardless of gender.

H4 Time investment into books of both large themes—social sciences and natural sciences—has the most positive effect on enhancing the student’s likelihood to take an interest in reading.

2. Materials and Methods

2.1. Material

2.1.1. Dataset

The dataset consists of 1676 observations, a subset of the data obtained through the survey “Studying reading habits and preference of junior high school students in Vietnam” [70]. The study was conducted by Vuong and Associates office, from December 2017 to January 2018. The survey concerns all adolescent students (grade 6 through 9, which corresponds to age 11 to 15) enrolled in public junior high schools in Ninh Binh Province, situated in the Northern part of Vietnam. The investigation was conducted in the form of directly filled questionnaires. The majority of the questions are multiple-choice.

Participating students were instructed by their homeroom teachers, who have previously been briefed by qualified personnel about the general significance of each notion in the questionnaire. This ensures that the respondents’ understanding of the term ‘reading’ is coherent.

On a provincial level, the original survey returned a dataset that could be considered a complete sample of junior high students in Ninh Binh. If representativity is considered on a national level, the data has been purposively sampled to represent junior high students from a typical province in Northern Vietnam, which could arguably extend to all junior high students in Vietnam. The data has also been obtained through convenience sampling: the research and survey team are based in the north of Vietnam, while the most willing collaborators are from the province of Ninh Binh.

The 1676-observation subset employed for analysis is a result of the first phase of data-entering process in the study and was not subjected to any selection.

2.1.2. Variables

We first investigated the students’ interest in the activity of reading through the direct question: “Do you like to read?”, coded as variable ‘Readbook,’ with two values of ‘yes’ and ‘no.’ Over 90% of students answered “yes.” This means that the majority of students self-report as being interested in reading (see Table 1).

The variable ‘Readbook’ was analyzed as the main dependent variable in this study.

The analyses would also contain the following independent variables:

- “Sex”: the gender of respondent, with two categories: “male” and “female”;
- “Grade”: the school grade of the respondent, with four categories: “gr6”, “gr7”, “gr8”, “gr9”, representing grades 6 to 9 respectively. This variable could be equated to the age of the respondents relative to each other;
- “RankinF”: the birth order of the respondent in their family. For example, if the student is a third child, they would answer with “3”;
- “Hobby”: the respondent’s favorite past time. This variable has 6 categories: reading (“a”), watching TV or listening to music (“b”), helping with chores (“c”), observing nature (“d”), socializing with friends (“e”), and others (“f”).
- “Buybook”: whether or not the respondent’s parents buy books for them, with two answers: “yes” and “no”;
- “Readstory”: whether or not the respondent’s parents read books for them, with two answers: “yes” and “no”;
- “TimeSci”: time per day spent reading natural sciences books (self-reported), with two categories: under 30 min (“less30”) and 30 min or over (“g30”);
- “TimeSoc”: time per day spent reading social sciences and humanities books (self-reported), with two categories: under 30 min (“less30”) and 30 min or over (“g30”).

A complete list of variables and their explanation, as well as other details concerning the design of the study and the original questionnaire could be found in Vuong, Le, La, Vuong, Do, Vuong, Do, Hoang, Vu, Ho and Ho [70].

Table 1. Distribution table of some categorical variables.

Code Name	Explanation	Items	Frequency	Proportion
Grade	Current grade	Grade 6	467	27.86%
		Grade 7	443	26.43%
		Grade 8	410	24.46%
		Grade 9	356	21.24%
Sex	Biological gender	Male	853	50.89%
		Female	823	49.11%
Hobby	Favorite pastime (self-reported)	Reading	331	19.75%
		Watching TV, listening to music	790	47.14%
		Helping with chores	180	10.74%
		Observing nature	59	3.52%
		Socializing	111	6.62%
		Others	205	12.23%
Buybook	Whether respondents' parents buy a book for them	Yes	1447	86.34%
		No	229	13.66%
Readstory	Whether respondents' parents read books for them	Yes	424	25.30%
		No	1252	74.70%
TimeSci	Time per day spent on natural sciences books	Under 30 min	846	50.48%
		30 min or over	830	49.52%
TimeSoc	Time per day spent on social sciences and humanities books	Under 30 min	1065	63.54%
		30 min or over	611	36.46%
Readbook	Answer to question: "Do you like reading books?"	Yes	1512	90.21%
		No	164	9.79%

2.2. Methods

Raw data were entered in an MS Excel spreadsheet and converted into CSV file type. Data analysis was done in R. The baseline-category logit (BCL) model was employed to explore the relationship between pairs of variables on the dependent variable. Similar usage of BCL can be found in [71,72]. To estimate how changes in the values of independent variables impact the dependent variable, logistic regression was used to predict the probability of a category of dependent variable Y against different values of independent variables x . Estimate coefficients were calculated through multinomial logistic regressions and later used to calculate conditional probabilities.

The general equation of the logistic regression model is as follows:

$$\ln \frac{\pi_j(\mathbf{x})}{\pi_1(\mathbf{x})} = \alpha_j + \beta'_j \mathbf{x}, \quad j = 1, \dots, J - 1.$$

in which x is the independent variable; and $\pi_j(\mathbf{x}) = P(Y = j|\mathbf{x})$ are the corresponding. $\pi_j = P(Y_{ij} = 1)$ with Y being the dependent variable.

The beta coefficient reflects the relationship between the corresponding independent variable x and the logit of dependent variable Y . When $\beta > 0$, larger values of x are associated with larger logits of Y and vice versa. When $\beta < 0$, larger values of x are associated with smaller logits of Y . $\beta = 0$ is considered the null hypothesis, which states that there is no relationship between x and Y in the population [73].

The probability of the values of the dependent variable is calculated as follows:

$$\pi_j(\mathbf{x}) = \frac{\exp(\alpha_j + \beta'_j \mathbf{x})}{1 + \sum_{h=1}^{J-1} \exp(\alpha_h + \beta'_h \mathbf{x})}$$

With $\sum_j \pi_j(\mathbf{x}) = 1$; $\alpha_j = 0$ and $\beta_j = 0$; in which n is the number of observations in the sample, j are the categorical values of an observation i , and h is the number of rows in matrix \mathbf{X}_i .

In this research, the dependent variable in all models is “Readbook.” The statistical significances of the models are assessed based on z -value and p -value ($p < 0.1$ was chosen as the threshold for statistical significance). All four models present in this paper employed the same regression method.

While it is technically possible to run a single regression of all independent variables present in this paper against the dependent variable “Readbook”, we have made a conscious decision to split our analyses into four models. This allowed us to focus on the effect of specific pairs of independent variables in relation to each other as well as to the response variable, as fitted models offer more precision [74].

3. Results

3.1. Descriptive Statistics

The data shows that “RankinF” ranges from 1 to 7; the largest total number of children in a family is reported to be 8. This means that the highest birth rank reported by our respondents is 7. In other words, none of the respondents is the youngest child in their family. The number of male and female students is relatively similar. Students are also distributed rather evenly between the four school grades, with sixth graders taking the largest share in the sample (~28%).

Despite the fact that 90% of students reported taking an interest in the activity of reading, only 20% considered reading to be their favorite hobby. The modal category was “watching TV or listening to music.” Females tend to prefer doing chores and observing nature more than males (see Table 6).

Regarding the type of books being read, books on natural sciences seemed to be favored: nearly half the number of respondents spend 30 or more on this type of books, whereas only one-third of students spend the same amount of time on social sciences and humanities books. The data also showed that sixth grade students spend the most time reading both kinds of books, compared to their seniors. In contrast, seventh grade students spend the least time on this activity (see Appendix A, Table A1).

Over 86% of respondents reported that their parents bought books for them; however, only 25% said their parents read books for them.

3.2. Regression Results

3.2.1. RQ1—H1

Does their birth order in the family affect a student's propensity to like reading books? What is the relationship between age (inferred from school grade), birth order, and reading interest?

In this first logistic regression model, the dependent variable “Readbook” was analyzed against two independent variables, “RankinF” and “Grade”. “RankinF” was treated as an ordinal variable. Results are displayed in Table 2.

Table 2 shows that all estimate coefficients are statistically significant ($p < 0.1$) and the null hypothesis is rejected. This means that there is a relationship between the birth order and grade of the respondents and their interest in reading.

Table 2. Estimate results of “Readbook” by “RankinF” and “Grade”.

	Intercept	“RankinF”	“Grade”		
	β_0	β_1	“gr7” β_2	“gr8” β_3	“gr9” β_4
Logit (yes/no)	3.543 *** [12.218]	−0.153 [−1.930]	−1.091 *** [−3.728]	−0.807 ** [−2.626]	−1.686 *** [−5.924]

Significance codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05; z-value in [square brackets]; baseline category for: “Grade” = “gr6”.
Null deviance: 1043.89 on 1660 degrees of freedom; Residual deviance: 994.06 on 1656 degrees of freedom;
AIC: 1004.1.

The relationship between the variables is presented in the following Equation (1):

$$\ln\left(\frac{\pi_{yes}}{\pi_{no}}\right) = 3.543 - 0.153 \times RankinF - 1.091 \times gr7 - 0.807 \times gr8 - 1.686 \times gr9 \tag{1}$$

From Equation (1), the conditional probability of each value of “Readbook” can also be calculated. For example, the probability of “yes” in “Readbook” at “RankinF” = 1 and “Grade” = “gr7” is:

$$\pi_{yes} = \frac{e^{(3.543-0.153 \times 1-1.091 \times 1)}}{1 + e^{(3.543-0.153 \times 1-1.091 \times 1)}} = 0.909$$

This probability measure means that a seventh-grade student who is the oldest child in their family is 90.9% likely to take an interest in reading. Similarly, other probabilities were calculated and presented in Figure 2 (Table of detail probability is in Appendix B, Table A2).

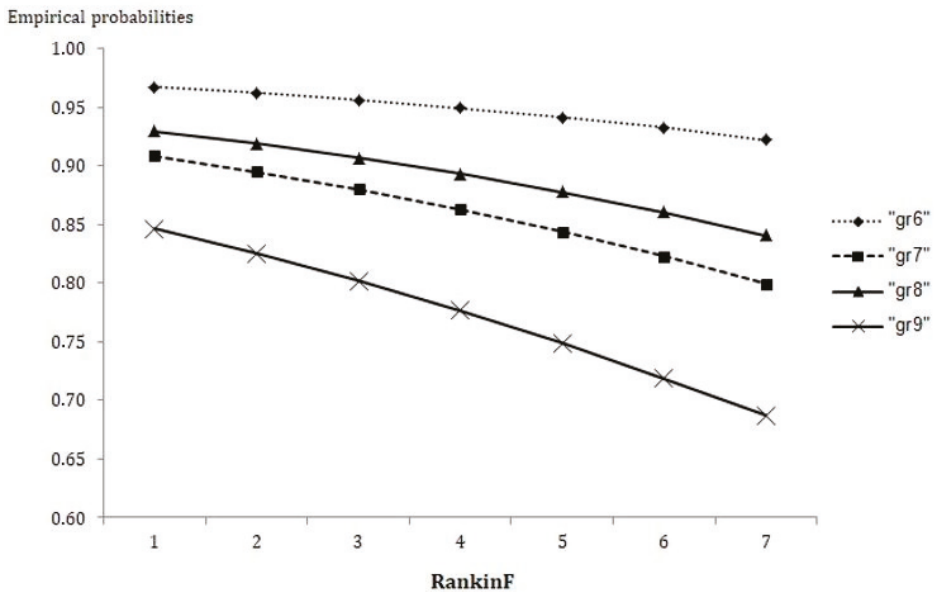


Figure 2. Probability of reading interest by school grade and birth order in the family.

The great majority of junior high students in Vietnam self-report as liking to read books. Figure 2 presents the probability of “Readbook” = “yes” across different categories of “Grade” and “RankinF”. All lines are above 65%, meaning that students are likely to answer “yes” to the question “Do you like reading books?” regardless of their grade in school or their birth order in their family. This could be

interpreted as Vietnamese students either having a high propensity for intensive reading habits or simply having a tendency to self-report as liking to read.

It is easy to observe that “gr6” is the highest line, and “gr9” is the lowest. This implies that younger students are more likely to answer “yes” to the question, “Do you like to read?” (the highest being 92–97% for sixth graders) than older students (69–85% for ninth graders, the lowest). This aligns with the findings in the literature: reading practices and enjoyment decline with age. It appears that Vietnamese students are not exempt from the general global tendency.

It should also be remarked that the gap between highest and lowest “Readbook” = “yes” probabilities is the largest for “gr9” (15.9 percentage points) and the smallest for “gr6” (4.5 percentage points). In other words, the decline of reading interest is aggravated by the respondent’s lower birth order in their family. This prompts for a further more in-depth view of the variable “RankinF”. When moving from value 1 to value 7 of variable “RankinF”, it could be easily observed that all lines “gr6”, “gr7”, “gr8” and “gr9” descend monotonically. This means that the more older siblings a student has, the less likely are they to self-report as liking to read. For example, a ninth-grade student who is a firstborn in the family would be 85% likely to report that they like reading, whereas a ninth-grade student who is the 7th child in the family would be only ~69% likely to report that they like to read.

A similar model examining dependent variable “Readbook” against “Grade” and “Hobby” points to the same tendency (see Appendix C, Table A6).

3.2.2. RQ2—H2

Does the parents’ act of buying books and reading books to their children affect the student’s reading habits? In which direction and how strong is the relationship?

To study the parents’ role in cultivating for their children an interest in book reading, this model employed “Readbook” as the dependent variable and “Buybook” and “Readstory” as independent variables, with statistically significant estimate results ($p < 0.01$) as shown in Table 3. There is thus a relationship between having parents who buy and/or read books for oneself and taking an interest in reading books.

Table 3. Estimate coefficients of “Readbook” against “Buybook” and “Readstory”.

	Intercept	“Buybook”	“Readstory”
	β_0	“Yes” β_1	“Yes” β_2
Logit (yes no)	1.391 *** [8.146]	0.841 *** [4.293]	0.753 ** [3.159]

Significance codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05; z-value in [square brackets]; baseline category for: “Buybook” = “no”, “Readstory” = “no”. Residual deviance: 0.0019 on 1 degrees of freedom. Log-likelihood: -9.6473 on 1 degrees of freedom.

The null hypothesis $\beta_1 = \beta_2 = \dots = 0$ was rejected with $p - \text{value} = 1.115 \times 10^{-7} \approx 0$, which proved that the model is appropriate. The regression equation was presented as follows:

$$\ln\left(\frac{\pi_{yes}}{\pi_{no}}\right) = 1.391 + 0.841 \times \text{yesBuybook} + 0.753 \times \text{yesReadstory} \tag{2}$$

Using this equation, probabilities of “Readbook” values against variables “Buybook” and “Readstory” were calculated (Table of detail probability is in Appendix B, Table A3). It could easily be seen that when parents actively buy and read books for their children, the likelihood of said children being interested in reading is 95.2%.

Figure 3 shows the role of parents in cultivating reading habits in students. A significant relationship can be observed as the dependent variable changes remarkably when moving from one value of the independent variables to another.

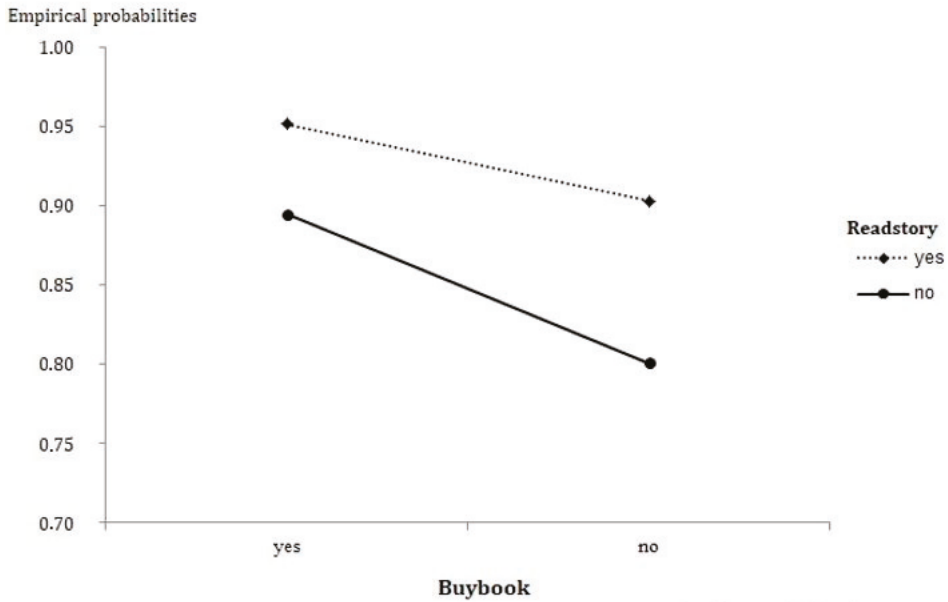


Figure 3. Probability of a student taking an interest in reading based on whether parents buy and read books for them.

The dotted line represents students whose parents have ever read books for them, whereas the other line represents those whose parents have never done so. The dotted line is well above, meaning that those who are often read to by their parents are much more likely to be fond of reading themselves. Similarly, parents buying books for their children also creates a positive influence in promoting reading interest. Namely, the probability of a student answer “yes” to “Readbook” at the point of “Buybook” = “yes” is ~90–95%, much higher than at “Buybook” = “no” (~80–90%). In addition, the effect of “Buybook” is stronger for students whose parents do not read for them: in fact, when moving from value “yes” to “no” of variable “Buybook”, the “Readbook” = “yes” line only drops 4.9 percentage points whereas the “Readbook” = “no” line drops 9.4 percentage points. In other words, the combined effects of having parents read for them and having books bought for them by parents enhance the student’s likelihood to form positive reading habits the most.

3.2.3. RQ3—H3

How do gender and pastime activities influence reading interest?

Gender and pastimes have a statistically significant influence on a student’s interest in reading, as shown in the summary table of the logistic regression of “Readbook” by “Sex” and “Hobby” (Table 4).

As observed, all *p*-values are inferior or equal to 0.01; the null hypothesis is rejected and all coefficients are statistically significant.

Using the above estimate coefficients, the following regression equation is formulated:

$$\ln\left(\frac{\pi_{yes}}{\pi_{no}}\right) = 4.818 - 0.918 \times \text{Male} - 2.281 \times b\text{Hobby} - 1.613 \times c\text{Hobby} - 1.948 \times d\text{Hobby} - 2.431 \times e\text{Hobby} - 2.383 \times f\text{Hobby} \quad (3)$$

Equation (3) is then used to calculate conditional probabilities, displayed in Table A4 (Appendix B). Visualization of probabilities is shown in Figure 4.

Table 4. Estimate coefficients of “Sex” and “Hobby” on “Readbook”. Note: a = reading; b = Watching TV/Music; c = Helping with chores; d = Observing nature; e = Socializing; f = Others.

	Intercept	“Sex”		“Hobby”			
		“Male”	“b”	“c”	“d”	“e”	“f”
		β_0	β_1	β_2	β_3	β_4	β_5
Logit (yes no)	4.818 *** [9.362]	-0.918 *** [-4.879]	-2.281 *** [-4.419]	-1.613 *** [-2.719]	-1.948 ** [-2.823]	-2.431 ** [-4.214]	-2.383 *** [-4.384]

Significance codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05; z-value in [square brackets]; baseline category for: “Sex” = “female”; “Hobby” = “a”. Residual deviance: 10.934 on 5 degrees of freedom. Log-likelihood: -26.1477 on 5 degrees of freedom.

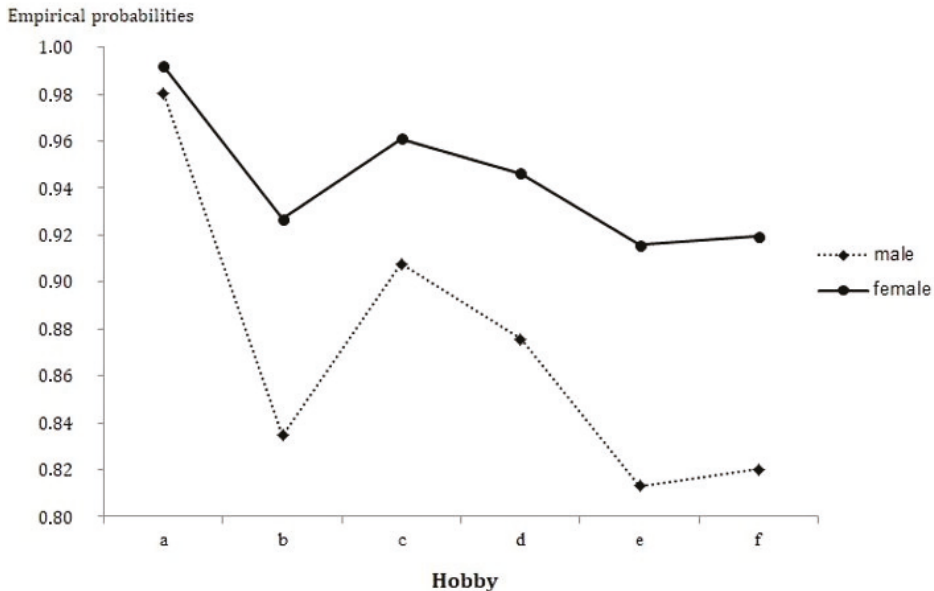


Figure 4. Probability of liking to read by gender and favorite hobby. Note: a = reading; b = Watching TV/Music; c = Helping with chores; d = Observing nature; e = Socializing; f = Others.

To have a better idea of how to interpret the probabilities, consider the following example: At “Hobby” = “e” and “Sex” = “male”, the probability of “Readbook” taking the value “yes” is 0.813. This means that a male student whose favorite past time is to socialize with friends is 81.3% likely to report having an interest in reading. Similarly, one can see that a female student whose favorite hobby is reading is 99.2% likely to self-report as liking to read.

There is a remarkable difference between male and female students in terms of reading interest. In fact, male students are less likely to report that they like reading (82–89%). This is consistent with the extant literature on gender-based differences in students reading practices, such as Moffitt and Wartella [37] and Majid and Tan [33]. Rather than merely confirming the literature on female readers’ predominance over males in reading avidity, these findings can also potentially bridge the gap between this and the smaller number of articles that had found out otherwise [30,39], by relating gender and favorite hobbies with reading interest in the same regression model.

On the one hand, regardless of gender, students who report reading as their favorite pastime are the most likely to reply “yes” to the question “Do you like to read?” (over 98%). In other words, considering reading as a favorite hobby is the strongest predictor to having great interest in reading. This is represented in Figure 3, along with several other findings. The second and third strongest

predictors for reading interest are “c”—helping with chores, and “d”, being in nature. They appear to be the most introspective out of all the options given in the questionnaire and suggest a significant degree of introversion.

In contrast, the likelihood of reading interest is second lowest at “b”—watching TV or listening to music, which is also the modal category of a favorite hobby for both genders. This result might strongly relate to previous studies on the shifts in reading practices and interest in the context of multimedia development. Finally, the probability of the respondent taking an interest in reading drops to the lowest at “e”—socializing with friends. In light of this, the relationship between favorite hobby and reading interest might be related to one or more factors, just as the literature has suggested. But more importantly, we now have a semblance of the bridge we meant to build: a relationship between sex-based differential reading interest, and sex-based differential leisure interests.

The reported results highlight the gender-based differences in hobbies between female and male pupils, directly in relation to their reading practices. The effects of different pastimes on reading practices mentioned above are much starker in males compared to females, with the difference in terms of probability of “Readbook_yes” between the highest point (“a”) and the lowest point (“e”) being 16.7 percentage points for male students and 7.6 percentage points for female. It seems that the type of favorite hobbies is a stronger predictor for male reading habits than for female. This finding might have to do with the nature of the favorite pastimes themselves. Vuong, Le, La, Vuong, Do, Vuong, Do, Hoang, Vu, Ho and Ho [70] already reported that female and male differed in terms of hobby preferences. Table 5 presents the differences in more details.

Table 5. Distribution of male and female respondents by favorite pastimes.

Favorite Pastimes	Male (%)	Female (%)
(a) Reading	13.4	26.4
(b) Watching TV/Listening to music	52.4	41.7
(c) Helping with chores	8.8	12.8
(d) Observing nature	3	4
(e) Socializing with friends	6.4	6.8
(f) Other	15.9	8.4

More than half of the male pupils reported multimedia (TV or music) as their preferred pastime, while the second most common favorite hobby appears not to be listed among the options provided in the questionnaire and likely pertains to sports or video games. Female pupils, on the other hand, are much keener on reading and helping with chores. As such, our results show clear evidence of a gender-based difference in interest.

3.2.4. RQ4—H4

Is there a correlation between the amount of time spent on reading social sciences and humanities books and on natural sciences books on one hand, and reading interest on the other?

To test the relationship between duration of time spent on reading books and interest in book reading, a logistic regression model was applied to independent variables “TimeSci” and “TimeSoc”, and dependent variable “Readbook”. The results are shown in Table 6:

As $p < 0.001$, all coefficients are shown to be statistically significant. From this, Equation (4) was formulated as follows:

$$\ln\left(\frac{\pi_{yes}}{\pi_{no}}\right) = 3.566 - 1.049 \times \text{less30TimeSci} - 0.919 \times \text{less30TimeSoc} \tag{4}$$

Using this equation, specific conditional probabilities could be calculated. For example, a student who spends less than 30 min on natural sciences books and over 30 min on social sciences and humanities books is 92.5% likely to take an interest in the activity of reading.

$$\pi_{yes} = \frac{e^{(3.566-1.049 \times 1)}}{1 + e^{(3.566-1.049 \times 1)}} = 0.925$$

The probabilities were visualized in Figure 5 (Table of detail probability is in Appendix B, Table A5).

Table 6. Estimate coefficients of “Readbook” against “TimeSci” and “TimeSoc”.

	Intercept	“TimeSci”	“TimeSoc”
	β_0	“Less30” β_1	“Less30” β_2
Logit (yes no)	3.566 *** [15.580]	-1.049 *** [-5.268]	-0.919 *** [-3.956]

Significance codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05; z-value in [square brackets]; baseline category for: “TimeSci” = “g30”, “TimeSoc” = “g30”. Residual deviance: 5.6254 on 1 degrees of freedom. Log-likelihood: -12.7051 on 1 degrees of freedom.

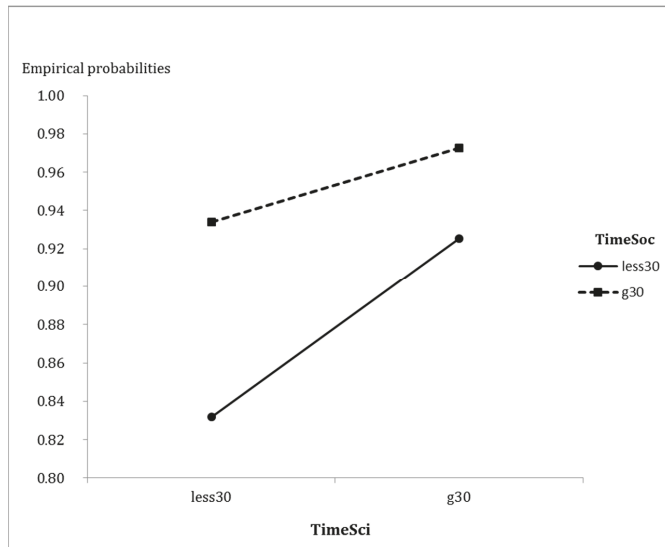


Figure 5. Probability of a student taking an interest in reading based on the amount of time they spend reading social sciences and humanities books and natural sciences books.

Figure 5 shows the propensity for self-reported preference for reading based on time spent on reading different types of books. It could easily be remarked that the combined effects of “TimeSoc” = “g30” and “TimeSci” = “g30” lead to the highest probability of liking to read. In other words, the more students spend time reading books, regardless of topics, the more likely they are to self-report as liking to read books.

Here, the result suggests that in order to develop reading habits of children, simply getting them to start reading would already provide a good entry point. More concretely, this means facilitating access to books, as well as promoting a culture of reading at school as well as at home. This also ties in with the findings in the previous section, according to which children whose parents buy and read books for them have a higher likelihood of being interested in reading practices.

More importantly, the different slopes of the two lines point out the incremental effect of spending more time to read, regardless of the type of books. In fact, if a student has already spent more than 30 min reading social sciences and humanities books, then whether they spend a lot of time (more than

30 min) or little time (less than 30 min) reading natural sciences books has little effect on the probability of them being fond of reading—only 4 percentage points (from 93 to 97%). On the contrary, if they spend little time reading social sciences and humanities books, then simply by spending more than 30 min reading natural sciences books would increase the likelihood of them liking the activity of reading by over 10 percentage points (from about 83% to nearly 93%). In other words, it does not matter whether students like to read literary works or popular science; as long as they spend more time reading books, even just one type of books, they would be more likely to report taking an interest in reading.

4. Discussion

4.1. Age and Birth Order

The reduced interest in reading among junior high school students has been documented before in a longitudinal study [30]. There could be, in fact, many reasons for pupils to lose their taste for reading. Given the dense curriculum in Vietnamese secondary education, it is often the case that older students have a heavier workload, thus less time for leisure reading. Besides, 9th-grade students see an especially severe drop in reading interest compared to younger students. This might be explained by the fact that 9th grade is the senior grade of junior high school in the Vietnamese educational system, and students are expected to take a senior high school entrance exam that is national and selective. This exam is widely considered to be even more important than the entrance exam for universities, therefore even more competitive. As such, 9th-grade pupils are obligated to spend a lot of time studying at school, at home, and in cram schools, which leaves them little time for leisure activities in general. They also often face harsh pressure from school, which might turn them away from any activities reminiscent of studying or activities that require more introspection, such as reading—a phenomenon that Mokhtari, Reichard and Gardner [26] has noted among college students. Finally, the decline in interest for reading could be a result of pupils' priorities changing with age: namely, older students are more pressured by the high school entrance exams and might be less inclined to spend their free time with books, which were intensively associated with schoolwork.

Regarding the association between the size of the family and the birth order of the child, our results appear to support the dilution model [49,50,52], with a specific focus on reading practices rather than merely child education in general. Our findings show evidence for the inverse relationship between pupil's reading interest and birth order, regardless of their school grade. A junior high-school-age adolescent is progressively less likely to take an interest in reading as they go down the ranks in terms of birth order. In other words, younger siblings in families with more children receive less attention from parents and thus are less likely to cultivate reading habits since childhood.

A feature worth noting is that the traditional household in Vietnam is often a three-generational extended family, consisting of the grandparents and at least one nuclear family unit of their offsprings. As such, the presence of extended family members should have an effect on the parental resource and family education, sometimes through delegation of responsibility of education [75,76]. Residence with the extended family could, in some case be a strategic choice to make use of parent aid [77]. The support provided by the delegation of caretaking tasks from parents to grandparents or uncles/aunts [76] could have in fact mitigated the dilution effect. However, one must take into account the deeply Confucian culture in the Vietnamese society [78–80], in which the first child, especially when said child is male, has a particular significance. This could cancel the positive effect of the extended caretaking resources of the three-generational family, leading back to unequal distribution of parental resource to the detriment of latter-born siblings.

The results presented in this section hint at the role of the family in cultivating reading habits among pupils. They also suggest a deeper look into the relationship between familial background in children's reading habits and, broadly speaking, education, all of which can very well be tested using the dataset prepared by Vuong, Le, La, Vuong, Do, Vuong, Do, Hoang, Vu, Ho and Ho [70]. Studies

have shown that the incremental effect of parent-child storybook reading diminishes as the child grows older, even in a short timespan such as from 2–3 years old to 4–5 years old [81]. As such, we went on to examine child reading interest in relation to family literacy. More specifically, we focused on parental provision of reading material as well as parent-child interaction in reading activities, in the section that follows.

4.2. Family Literacy

Previous findings have indeed emphasized on the significant role of cooperation between home and school in regards to developing reading abilities among children, more precisely the role of parents in the forming and encouraging of reading practices since childhood [42–44,81,82]. Where the vast majority of the extant literature focused on early childhood when it comes to parent-child reading experiences, this paper contributes results pertaining to junior high school-age adolescents. A point worth noting is that the likelihood of a student taking an interest in reading is the highest when their parents both buy books for them and read for them. This suggests that merely providing the material for children—namely, by buying them books—would not be as effective in creating a culture of reading in the family, compared to when parents actively guide their children into the world of reading. Despite this, the practice of reading for children is not widespread in Vietnam. In fact, while 86.3% of respondents have books bought for them by their parents, only 25.3% reported that their parents read books for them.

This is especially meaningful because children who received encouragement to read and access to book are more likely to have better educational records due to the development of skills and cognitive ability [22,83,84]. Storybook reading by parents is positively related to the development of skills related to language and reading in children [82]. Also, storybook reading by parents has been shown to be linked with reading motivation, especially in the case of struggling children [42]. In other words, having the family cooperate with the school would be optimal in initiating reading practices, forming reading habits, improving reading competency, and ultimately enhance the cognitive and academic ability of pupils.

4.3. Gender and Pastime

It is thus very often suggested that both biology and socialization—whether one factor dominates the other or not—come into play in determining sex-based differences in behavior and choices. More importantly, what matters to us is that there are such things as gendered, differential behaviors, namely in terms of leisure activity preferences, as shown in our results. In congruence with past findings, our data show a difference in male versus female hobbies, which is linked to male versus female reading interest. Our line of distinction (rather than Things versus People) is drawn between activities of high sensory stimulation (socializing with friends, watching TV/listening to music) and low sensory stimulation (reading, observing nature, helping with chores). Other than the fact that both boys and girls reported watching TV/listening to music as their favorite hobby, boys tend to adhere to the first group, whereas girls are more inclined to the second. It is also worth noting that girls are significantly more likely to report reading as their favorite leisure activity. More in-depth research would be necessary to establish any significant relationship between gender and types of leisure interest, as well as how it is linked to reading interest and practice.

A more thorough discussion on natural science versus humanity and social sciences in terms of book content and time spent on books follows in the next section.

4.4. Time Spent Reading

Regarding the genre of books, our model does not compare the influence of time spent on natural sciences books versus that on social sciences and humanities books separately; neither does it explore the role of time spent on reading books of either type on reading practices in regards to other factors such as age or gender. Rather, we compare the incremental values of spending more time on another type of

book when considerable time has been spent on one type of book. In other words, the emphasis lies on the variety of books being read. Even when respondents are avid readers of one type of books, their reading interest is still lower than respondents who spend a substantial amount of time (over 30 min) on both types of books. In other words, combining reading science and literary books strengthens the positive relationship that extended reading time had with reading interest. This suggests that in promoting reading, one must take into consideration not only the quantity but also diversification of reading materials. Previous findings suggested that reading fiction books had improved readers' empathy and social cognition [85,86]. Topping, Samuels and Paul [38] found that students who read fiction books are at a higher reading level compared to those who read non-fiction; they also boast higher reading quality. Non-fiction books were found to be more challenging and negatively correlated with reading achievement gains.

In addition, this also suggests that diversity of book genre might reduce boredom and enhance the reading experience, which could in turn be a solution to decline in reading enjoyment. Moreover, diversification of book genres could fit in more themes/subjects in terms of content, thereby tailor to the interest of different personalities. In the context of Vietnam, as the world of arts is being neglected [87], a strong emphasis on fiction and art books would generate interest among younger populations, teach children how to understand art, the craft of art-making, and foster a strong appreciation for the beauty of the world. Meanwhile, science, philosophy and technology books would introduce the younger populations to science, help them understand how science works, and the importance of scientific contributions to the world, and prepare for the future scientists.

4.5. Strategies for Sustainable Reading Culture

In order to promote sustainable reading habits in junior high school students, the collaboration among government, school, and family is important. Firstly, the government has a leadership role in promoting education for sustainable development. For instance, the funding to establish more public and in-school libraries and improve the quality of library services are necessary actions for the goals of sustainable education. Our results have shown that passive encouragement to books, represented by the provision of books to students by their own parents at home, already enhanced the likelihood of a student being interested in reading. Not all families could afford a variation of books, or are aware of the benefits of book reading, be it in terms of academic success, cognitive development or even simply personal enjoyment. While public facilities would not and should not aim to replace family literacy, well-equipped and accessible libraries would at least smooth out the differences between urban, more privileged students, and students in less developed areas.

Secondly, a reading culture fostered by the school helps to promote equitable education, which is one of the goals of sustainable development specified by UNESCO. Thus, schools have a vital role in stimulating students' interest to learn and lifelong learning skills. These results also suggest a review of the school curriculum and pedagogy. Schools should, in fact, not only focus on promoting interest in studying and cultivate a taste for knowledge seeking among students, but also seek to sustain such interest. As such, it is not the quantity of knowledge or school subjects that should take center stage, but the student's enjoyment. In essence, studying should not be a factor that distance students from activities that could have been recreational but has become associated with school and thus lost appeal—namely, in this case, the activity of leisure reading.

It should also be noted that junior high school pupils in Vietnam intensively associate books with school. Based on the dataset published in Vuong, Le, La, Vuong, Do, Vuong, Do, Hoang, Vu, Ho and Ho [70], a large number of pupils still cited school textbooks (such as 7th Grade Literature, for example) when asked about their favorite leisure books, with an explicit requirement to exclude school textbooks. This suggests that Vietnamese pupils attribute reading to schoolwork more than to recreation, and also that their repertoire is rather limited. Hence, schools should develop and integrate different activities to stimulate students' extrinsic and intrinsic motivation for reading. Examples of measures include independent reading time in class; extensive reading as a part of assigned learning

activities and homework; organizing reading clubs and activities related to reading such as debating or writing competitions, exhibitions that encourage teachers and students to bring reading materials and draw book illustrations for display. Moreover, training programs for teachers and librarians to engage in reader development are also needed. In order to implement these changes successfully, the involvement of the government through regulations, laws, and policies is also necessary.

Finally, family and a scholarly culture at home have been proved to be important for fostering children's reading habits. Parents are the role models, motivators, and facilitators for their children. Joining children in reading activities, encouraging them to develop positive attitudes to print language, and maximizing their access to books from an early age are important factors that will promote lifelong learning behaviors. Policy-makers should consider the fact that reading promotion is not only about the student but also their familial environment, as evidenced by reports such as Clark and Foster [28]. Moreover, parents should not only be encouraged to read for their children but read with their children. Research studies have suggested that it is not merely the existence of the storybook reading experience, but the parent-child interaction during those experiences that determine the effectivity of shared reading time on promoting childhood literacy [47,82,88]. Yet, numerous studies such as have pointed out that parents do not intuitively seek dialogues and interaction when reading to their child; there is reading styles would change drastically if a form of instruction was given [89,90]. As such, it might be the case that campaigns for promotion of reading should not only focus on just the child reader but also include assistance or instruction to parents in regards to how they should carry out the experience of storybook reading.

As complex as the topic is, the findings raised in this paper and the corresponding policy implications have hardly touched on all the issues related to reading and elementary education in Vietnam, which future research could address. In regards to reading enjoyment and interest among junior high-age pupils, future studies may benefit from drawing on the extant research on different reading instruction techniques. For example, the majority of the literature on dialogic reading techniques, first developed by Whitehurst, et al. [91], has so far only focused on preschool-age children and their reading capacity development. Given its positive effect as supported by many studies throughout the years and across the globe [81], it would be of interest to attempt these techniques in the junior high-school age range. Regarding methodology, as has also been shown in our study, elements such as the subject's time spent on reading or interesting reading could prove difficult to measure without relying on self-report, which would then raise the question of the validity of assumptions. In this case, different statistical approaches such as Bayesian statistics could be used for data analysis [92], to provide results in which difficulties that are exclusively related the frequentist approach—such as the question of assumption, as stated above—would be mitigated or eliminated completely.

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Appendix A. Cross-Tabulation of “TimeSoc”, “TimeSci” and “Grade”

Table A1. Cross-tabulation of “TimeSoc”, “TimeSci” and “Grade”.

TimeSoc	TimeSci	Grade			
		6	7	8	9
g30	g30	138	108	123	68
	less30	49	39	52	34
less30	g30	133	73	97	90
	less30	147	223	138	164

Appendix B. Tables of Detail Probabilities for Each Research Question and Hypothesis

Table A2. Probabilities of “Readbook” against “Grade” and “RankinF” (RQ1—H1).

“Readbook” “Grade” “RankinF”	“Yes”							“No”						
	1	2	3	4	5	6	7	1	2	3	4	5	6	7
“gr6”	0.967	0.962	0.956	0.949	0.941	0.932	0.922	0.033	0.038	0.044	0.051	0.059	0.068	0.078
“gr7”	0.909	0.895	0.880	0.863	0.844	0.823	0.799	0.091	0.105	0.120	0.137	0.156	0.177	0.201
“gr8”	0.930	0.919	0.907	0.893	0.878	0.860	0.841	0.070	0.081	0.093	0.107	0.122	0.140	0.159
“gr9”	0.846	0.825	0.802	0.776	0.749	0.719	0.687	0.154	0.175	0.198	0.224	0.251	0.281	0.313

Table A3. Probabilities of “Readbook” against “Buybook” and “Readstory” (RQ2—H2).

“Readbook” “Buybook” “Readstory”	“Yes”		“No”	
	“Yes”	“No”	“Yes”	“No”
“yes”	0.952	0.903	0.048	0.097
“no”	0.895	0.801	0.105	0.199

Table A4. Probabilities of “Readbook” against “Sex” and “Hobby”. Note: a = reading; b = Watching TV/Music; c = Helping with chores; d = Observing nature; e = Socializing; f = Others. (RQ3—H3).

“Readbook” “Sex” “Hobby”	“Yes”						“No”					
	“a”	“b”	“c”	“d”	“e”	“f”	“a”	“b”	“c”	“d”	“e”	“f”
“male”	0.980	0.835	0.908	0.876	0.813	0.820	0.020	0.165	0.092	0.124	0.187	0.180
“female”	0.992	0.927	0.961	0.946	0.916	0.919	0.008	0.073	0.039	0.054	0.084	0.081

Table A5. Probabilities of “Readbook” against “TimeSci” and “TimeSoc” (RQ4—H4).

“Readbook” “TimeSci” “TimeSoc”	“Yes”		“No”	
	“Less30”	“g30”	“Less30”	“g30”
“less30”	0.832	0.925	0.168	0.075
“g30”	0.934	0.973	0.066	0.027

Appendix C. Estimate Results of “Readbook” by “Grade” and “Hobby”

Table A6. Estimate results of “Readbook” by “Grade” and “Hobby”.

Intercept	“Hobby”						
	“Grade”	“b”	“c”	“d”	“e”	“f”	
	β_0	β_1	β_2	β_3	β_4	β_5	β_6
Logit (yes/no)	7.109 *** [9.116]	-0.376 *** [-4.692]	-2.306 *** [-4.471]	-1.457 * [-2.453]	-1.919 ** [-2.783]	-2.445 *** [-4.242]	-2.373 *** [-4.362]

Significance codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05; z-value in [square brackets]; baseline category for: “Grade” = “6”; “Hobby” = “a”. Null deviance: 1073.77 on 1675 degrees of freedom; Residual deviance: 992.26 on 1669 degrees of freedom; AIC: 1006.3.

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Article

Internationalization and Its Discontents: Help-Seeking Behaviors of Students in a Multicultural Environment Regarding Acculturative Stress and Depression

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Abstract: Stress and depression can be seen as the major obstacles for sustained education and attainment of foreign students, and in turn, the sustainability of an education system as a whole. However, the mainstream consideration following Berry's model on acculturation does not take into account whether students of the host countries are immune to these problems. This study aims to examine the prevalence and predictors of help-seeking behaviors among international and domestic students in a multicultural environment by employing ANOVA and polynomial regression. Some significant results from this study are: (1) Informal sources were the most prevalent sources of help-seeking among international and domestic students, while formal help-seeking was not popular; (2) international students were more likely to overcome emotional difficulties alone and seek help on the Internet than domestic students; (3) acculturative stress was a positive predictor of formal, informal, and miscellaneous help-seeking behaviors among international students and informal help-seeking behaviors or among domestic students; and (4) depression was negatively correlated with the willingness of international students to seek help from informal sources. The findings hint at the risk of acculturative stress faced by domestic students in a multicultural environment being overlooked and the lack of help-seeking sources for international students. The study also provides empirical evidence for policy-planners to design a sustainable education system better at supporting students dealing with depression and acculturative stress.

Keywords: sustainable education; internationalization; international university; higher education; help-seeking; acculturative stress; depression; international student; social connectedness; Japan

1. Introduction

1.1. Internationalization in Education and Its Discontents

As globalization is making the world more interconnected than ever, the exchange of knowledge and workforce, the two key driving factors of the world development, has increased both in quality and quantity. As a result, international student inbound and outbound have significantly increased. According to UNESCO, the number of international students worldwide has grown over 25% in

5 years, from 2012 to 2017 [1]. In Japan, the growth rate is even more impressive. From 2012 to 2017, the number of international students in Japan increased by 93.9%, from 137,756 to 267,042 students [2,3].

As living in a new environment is a double-edged experience [4], studying abroad could, on the one hand, provide students with good opportunities for personal and intellectual development, and on the other hand, might pose threats to their well-being, especially their mental health. Mental health problems were found to be more prevalent in the university population than the general population and non-student populations of the same age [5,6]. Mental health risks among international students are even more prominent than among domestic students. In one study done in Japan, depression is much more prevalent among international students (37.81%) than domestic students (29.85%); international students also suffer from a higher level of acculturative stress than domestic students [7]. The problems which arise in the process of acculturation for people who move overseas have been treated in Berry's model in 1983 and 1997 [8,9], however, whether people in the host countries are immune is not often raised in the mainstream discussion. In contrast, the trend of growing inbound and outbound students is likely to be popular even in emerging economies [10,11] since internationalization of education has been shown to revitalize the economy in some cases [12] and can be considered an on-the-spot-export product in certain countries [13,14]. That means the mental health risks posed by acculturation in times of growing internationalization for domestic students might be an important under-researched area. As a consequence, conducting a comparative study is essential for examining the effects of internationalization on education more holistically. In addition, since mitigating the risks of poor mental health among university students is crucial to policy-making, this study wishes to advance the literature and provide empirical evidence regarding help-seeking behaviors in both international and domestic students in international universities.

In next sub-sections, the literature review on help-seeking behaviors among international and domestic students is conducted to clarify the objectives of this study. Materials and methods being employed in this study are described in Section 2, while all findings from the statistical analysis are explained in Section 3. In the Discussion section, most important findings are highlighted and discussed on the basis of other theoretical frameworks and empirical results.

1.2. Help-Seeking Behavior among International and Domestic Students

Mental health issues among university students appear to grow in both prevalence and severity [5,15]. However, it was reported that many students with mental disorders do not receive appropriate treatment [6]. Depending on types of mental health problems, 37% to 84% of university students in a study conducted by Eisenberg, Golberstein, and Gollust reported not receiving any support services [16]. According to American College Health Association, only 24% of depressed college students received treatment [15]. This is understandable, considering the percentage of students seeking help across all types of psychiatric disorders is relatively low, with fewer than 25% of individuals suffering from a psychiatric disorder and having sought help in the year prior to the survey [17]. A study on university students in England indicated that 30% and 17% of students with mild psychological distress sought help and met counselor respectively, while 58% and 30% of students suffering severe psychological distress sought help and received counselling [18]. One study conducted at a university from Ireland showed that around 30% of students looked for help from professional sources; informal sources were more commonly used than formal sources [19].

Help-seeking rate is also not high among international students. Based on a survey of 172 international students from 75 countries, Dadfar and Friedlander showed that only 22% had sought help from professionals; of the 22%, 66.6% and 41.7% were willing to seek help from counselors/psychologists and psychiatrists respectively [20]. Around 65% of international samples in the study of Han and Pong expressed their willingness to seek professional help [21]. Another study on Turkish students in United States indicated that international students preferred to seek help from friends (50%) rather than from formal sources, such as psychologist (14%), counselor (11%), psychiatrist

(8%), and academic adviser (2%); interestingly, not seeking help from anyone (12%) was also an option among international students [22].

In Japan, college students are less likely to have positive attitudes toward formal help-seeking sources compared to informal sources [23,24]. The most common sources of support for Japanese college students were friends (60%) and siblings (40%), while the percentage of Japanese college students seeking help from professional sources was relatively low, at only 4.3%. Besides that, the number of students trying to solve mental health problems alone was relatively high, about 35% [25]. To the best of our knowledge, no research has compared how international and domestic students differ in their behavior regarding both formal and informal sources of help; most studies focus only on formal sources. Moreover, it appears that research on the prevalence of help-seeking intention among international and domestic students in Japan, a country with rapid internationalization of education [2,3], remains limited.

1.3. Predictors of Help-Seeking Behaviors

As theories of help-seeking behavior have not been unified into a single framework [26], this section will provide an overview of the theoretical background. The *Health Belief Model* takes an individualistic approach in explaining professional help-seeking behavior. According to this model, providing students with knowledge and changing their attitudes and beliefs regarding mental health would increase the number of students accessing to service [27]. This model has been supported by empirical evidence among domestic [28–30] and international students [20]. For example, Thomas, Caputi, and Wilson found that recognition of mental health problems and benefits of receiving treatment, and openness to treatment would influence the behavior of university students in seeking professional help [30]. A research by Dadfar and Friedlander on international students pointed out that Confidence/Appropriateness and Stigma/Privacy are strong predictors of help-seeking from professionals [20].

Similar to the *Health Belief Model*, the *Andersen Behavioral Model* also considers professional help-seeking behaviors at the personal level, albeit with a stronger emphasis on social and structural elements [31]. The model consists of three main factors determining health behavior: predisposing characteristics (e.g., demographic, social structure, and health beliefs.), enabling resources (e.g., health personnel and facilities availability, income, and health insurance) and need (e.g., perceived need). It has also received much support from various scientists in both studies on the populations of domestic students [24,32] and international students [33,34]. A meta-analysis of 5713 undergraduate and graduate students found that cultural background of individual students influenced their decision of seeking professional psychological help [32]. Acculturation has also been found to be positively predictive of help-seeking from professional sources, namely in the case of Mexican students in the United States [33].

Help-seeking sources do not consist solely of professionals; they might be informal sources (parents, friends, e.g.). The essential roles of informal sources for help-seeking are highlighted in the *Network Episode Model* [26]. This idea of considering informal sources as other channels for help-seeking has been supported by many studies [19,25,33,35]. In particular, Goodwin et al. found that informal help-seeking sources were more popular among university students than formal help-seeking sources, and students availing of informal sources reported greater level of well-being [19]. In addition, a study on help-seeking behaviors among Japanese college students revealed that seeking help from informal sources were relatively prevalent and predicted by collective identity of Japanese students [25].

There are also several other help-seeking options that are necessary to mention, such as help-seeking on the Internet and self-help. It was recorded that 56% of people used the Internet as a source to find health related information [36] and the Internet was a useful source for easing mental health problems [37,38]. Gould et al., Ybarra, and Suman promoted the Internet as an essential source of help-seeking among university students [36,39]. On the other hand, a high number of

Japanese students trying to deal with mental health problems alone was recorded: 35% of students in study of Yeh et al. [25] and 65% of Japanese male students in the study of Chan and Hayashi [35].

1.4. Research Objectives

To the best of our knowledge, no comparative study on formal, informal and miscellaneous help-seeking behaviors among international and domestic students has been conducted. Moreover, it appears that there is scarcely any research on the correlation between depression, acculturative stress, social connectedness, and formal/informal help-seeking behaviors among international and domestic students. Thus, this study aims to fulfill two objectives:

- 1 Examine and compare the help-seeking behaviors of domestic and international students in a Japanese international university.
- 2 Evaluate the association of depression, social connectedness, and acculturative stress on help-seeking behaviors among international and domestic students in Japan.

2. Materials and Methods

2.1. Study Site

In this study, Ritsumeikan Asia Pacific University (APU) was selected as the study site for several reasons. The university, located in Oita Prefecture, is Japan's first truly international university and currently the most international university in Japan [40]. It was established in April 2000 with an objective to become a campus with equal proportions of international and domestic students. As of 2017, 50.1% of total students in APU were international students that originated from 86 countries and regions [41]. Besides the high percentage of international students, 50% of the faculty members in APU are international, which makes APU the university with the greatest share of international faculty in Japan [40]. Overall, APU's high internationality makes it a very appropriate study site for understanding the difference between help-seeking behaviors of domestic students and international students in Japan.

2.2. Participants

Participants of the current investigation were 67 domestic (25%) and 201 (75%) international students (see Table 1). There was a substantial difference in gender of the respondents: the percentage of females (63.43%) was two times higher than the percentage of males (36.57%). Most domestic respondents (53.73%) reported having had 2 to 3 years of stay since they first came to the international university.

English proficiency was much higher in international students (76.12% could speak English fluently) than domestic students (19.40% could speak English fluently). As for Japanese proficiency, international respondents possessed relatively low Japanese level with only 12.44% able to speak Japanese fluently. On average, nearly 60% of both domestic and international respondents reported not having an intimate partner (e.g., girlfriend, boyfriend, wife, or husband). Fewer domestic students (23.88%) considered themselves religious than international students (37.31%).

Among 201 international students, 61% of international students were from South East Asia (Vietnam, Indonesia, Thailand, and Malaysia), 25% were from East Asia (China, Korea, and Taiwan), 9% were from South Asia, and 5% from other regions.

Table 1. Socio-demographic characteristics.

	Total Students N = 268 Weighted %	Domestic Students N = 67 Weighted %	International Students N = 201 Weighted %
Gender			
Male	36.57%	37.31%	36.32%
Female	63.43%	62.69%	63.68%
Age			
17–19	33.96%	28.36%	35.82%
20–22	48.13%	62.69%	43.28%
>22	17.91%	8.96%	20.90%
Length of stay			
1 year	42.91%	29.85%	47.26%
2–3 years	45.15%	53.73%	42.29%
>3 years	11.94%	16.42%	10.45%
English proficiency			
Low	8.21%	22.39%	3.48%
Average	29.85%	58.21%	20.40%
High	61.94%	19.40%	76.12%
Japanese proficiency			
Low	34.33%	1.49%	45.27%
Average	33.21%	5.97%	42.29%
High	32.46%	92.54%	12.44%
Intimate partner			
No	58.58%	59.70%	58.21%
Yes	38.43%	40.30%	37.81%
Religion			
No	66.04%	76.12%	62.69%
Yes	33.96%	23.88%	37.31%

2.3. Instruments

The respondents were asked to complete a Demographic questionnaire, the Patient Health Questionnaire-9 (PHQ-9) [42], the Social Connectedness Scale (SCS) [43], the modified Acculturative Stress Scale for International Students (ASSIS) [44], and the General Help Seeking Questionnaire [45]. Among these measurements, the measuring instruments of depression (PHQ-9), acculturative stress (ASSIS), and Social Connectedness (SCS) were similar to previous study [7].

2.3.1. Socio-Demographic Questionnaire

In the Demographic questionnaire, participants were asked to provide information about their age, gender, country of origin, educational level, length of stay (length of stay in Japan for international students and length of stay in APU for domestic students), English proficiency, Japanese proficiency, intimate partner, and religion. Self-reported language proficiency was rated on a 5-point Likert scale from 1 (beginner) to 5 (native), while information regarding of intimate partner and religion were asked using a yes-no type question.

2.3.2. Measure of Help-Seeking Behaviors

Currently, there is no universally accepted measure of help-seeking behavior. The two most widely used tools to measure help-seeking in adolescents are Barriers to Adolescent Seeking Help questionnaire (BASH) [46] and the General Help Seeking Questionnaire (GHSQ) [45]. In this study, GHSQ was selected because it has been employed in many studies of help-seeking behaviors in both college students [19,47,48] and adolescents [49–51]. Moreover, the GHSQ covers not only formal

sources of help-seeking but also informal and miscellaneous sources of help-seeking. The content of the questionnaire can also be easily modified depending on the target of the study.

The GHSQ is a flexible tool that can be used to assess intentions of help-seeking from a wide range of sources (both formal and informal). The questionnaire consists of two subscales covering two types of problem: personal-emotional problems and suicidal ideation problems. In this study, we only used the subscale measuring the help-seeking intention when students had personal-emotional problems.

As adolescents have a tendency to seek help from Internet during tough time [39,52], the Internet was added in the GHSQ as a potential help-seeking source of students. Thus, the modified-GHSQ consisted of 11 potential sources which were divided in to 3 groups: formal sources, informal sources, and miscellaneous. The formal sources included mental health professionals and doctors [53,54]. Informal sources included parents, intimate partners, friends, family relatives, and religious leaders [53]. The remaining sources were listed in the miscellaneous group because some of them could be both formal and informal sources and their characteristics do not show a clear pattern.

Each item in GHSQ was rated on a Likert scale, which ranged from 1 (extremely unlikely) to 7 (extremely likely). In order to examine the prevalence of help-seeking behavior among students, students who reported from 5 (likely) to 7 (extremely likely) in any source were considered as seeking help from that source. An individual was considered to be predominantly seeking help from a certain group of sources (formal, informal, or miscellaneous) depending on the average score of all sources belonging to said group. For example, if the scores of seeking help from intimate partner, parent, friend, relative, and religious leader, averaged to equal or more than 5, the individual would be seen as likely to seek help from informal sources. The similar logic applied to formal and miscellaneous sources. Eventually, seeking help and not seeking help from a source were coded as 1 and 0 respectively.

2.3.3. Measure of Depression

The level of depression was measured using the Patient Health Questionnaire (PHQ-9) [42] for two reasons. First, PHQ-9 has been used to diagnose depression and estimate depressive severity in various populations including university students and international students [16,55–57]. Second, the questionnaire has been used in studies of university students in some countries around the world, such as United States, Japan, China, New Zealand, Ethiopia, and Trinidad and Tobago [7,56,58–60].

PHQ-9 is a nine-item self-assessed questionnaire based on the Diagnostic and Statistical Manual for Mental Disorders-4th edition (DSM-IV) criteria for diagnosis of depression. Besides diagnosing major depressive disorder and other depressive disorders, the questionnaire also estimates the severity of depression by inquiring on the frequency of various symptoms over the past two weeks. The frequency is scored from 0 (not at all) to 3 (nearly every day). Sample items from PHQ-9 are 'Little interest or pleasure in doing things' and 'feeling down, depressed, or hopeless'. The internal consistency of the questionnaire in the current study was acceptable at 0.81 and 0.80 for international and domestic student samples respectively.

2.3.4. Measure of Social Connectedness

To measure the level of social connectedness in both domestic and international students, we employed the Social Connectedness Scale (SCS) [43] as have done other studies [61–63]. The SCS is a self-administered questionnaire examining individual's emotional distance or connectedness between itself and other people based on Self Psychology theory [43]. The questionnaire consists of eight questions, which is rated on a 6-point Likert scale ranging from 1 (Strongly disagree) to 6 (Strongly agree). 'I feel disconnected from the world around me' is a sample item from SCS. The result in the current study was modified using Microsoft Excel so that the higher the score, the higher the level of social connectedness. In the current study, internal consistency was at 0.95 for both international and domestic students, which was even higher than Cronbach's alpha in other studies [62–66].

2.3.5. Measure of Acculturative Stress

The Acculturative Stress Scale for International Students (ASSIS) [44] was selected and modified as a measure of acculturative stress in the current investigation. ASSIS, a 36-item questionnaire about acculturative stress of international students, consists of 7 subscales: Perceived discrimination (eight items), Homesickness (four items), Perceived hatred (5 items), Fear (4 items), Cultural shock (3 items), Guilt (2 items), and Miscellaneous (10 items). Each item was rated based on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The total acculturative stress is the sum of 36 items. The higher the total score, the greater acculturative stress students possess.

To keep the ASSIS appropriate with the study site, some modifications were made. As our study site was an English-speaking campus in a Japanese-speaking country, we added 'I feel nervous to communicate in Japanese' based on the item 'I feel nervous to communicate in English'. Moreover, because SCS already covered factors related to social connectedness, we omitted the item 'I feel intimidated to participate in social activities' to keep the score from 36 to 180 like the original version.

The ASSIS has been widely used in many studies of acculturation in international students [64,67,68]. The internal consistencies in those studies was from 0.92 to 0.95. Compared to other studies, internal consistencies of the ASSIS for both domestic and international students were relatively higher at 0.95.

2.4. Procedure

We used Google Form as the tool for data collection due to its simple management and easy accessibility. After designing, the questionnaire was sent to the Ethical Committee Board of APU for internal review. The link to the questionnaire was later distributed in several classes through the University's internal course management system and Vietnamese community group in late 2018. A 5 min presentation was done to explain the purpose, contents, and confidentiality of the questionnaire. Besides that, we also noted that filling the questionnaire was voluntary, and encouraged students to answer truthfully. The response rate was 40.05% (268/669). Some late responses were also recorded.

2.5. Methodology

There were two stages in this analysis. In the first stage, the help-seeking behaviors among domestic and international students were not only visually compared through graphs and tables, but also examined using one-way ANOVA test. In the second stage, the determinants of help-seeking behaviors among domestic and international students were examined using the polynomial regression analysis.

Raw data was downloaded from Google Form, edited in Microsoft Excel and stored as CSV file. Then, STATA statistical software (version 15.1) was used to run the regression analysis. Before running the multiple regression analysis, correlations among all variables were tested to avoid multicollinearity. Moreover, multiple regression model also comprised Robust analysis to exclude outliers [69]. In regression analysis, p -value shows whether independent variables are statistically significant or not. It is conventional to consider variables with p -value < 0.05 to be statistically significant [70].

2.5.1. Dependent Variables

Dependent variables in the multiple regression model include both the 11-individual help-seeking sources and the three groups of help-seeking sources (see Table 2). First, each help-seeking group was used as dependent variable to examine general associations between independent variables and three major help-seeking groups. The score of help-seeking group was measured by taking the average of all help-seeking sources within that group. After using help-seeking groups as dependent

variables, help-seeking sources in each group were also employed as dependent variables for finer statistical analysis.

Table 2. Dependent variables.

Group		Source		Description
Name	Variable	Name	Variable	
Formal	"Formal"	Mental health professionals	"Pro"	The likeliness to seek help from psychologist, social worker, counsellor, e.g., from 1 to 7
		Doctors	"Doctor"	The likeliness to seek help from doctor, general practitioner (GP), e.g., from 1 to 7
Informal	"Informal"	Intimate partner	"Partner"	The likeliness to seek help from girlfriend, boyfriend, husband, wife, e.g., from 1 to 7
		Friends	"Friend"	The likeliness to seek help from friends from 1 to 7
		Parents	"Parent"	The likeliness to seek help from parents from 1 to 7
		Family relatives	"Relative"	The likeliness to seek help from family members and other relatives from 1 to 7
Miscellaneous	"Miscell"	Religious leaders	"Religion"	The likeliness to seek help from Priest, Rabbi, Chaplain, e.g., from 1 to 7
		Phone helpline	"Phone"	The likeliness to seek help from helpline, e.g., from 1 to 7
		Internet	"Internet"	The likeliness to seek help from website, social media, e.g., from 1 to 7
		Alone	"Alone"	The likeliness to seek help from solving things alone from 1 to 7
		Other sources	"Other"	The likeliness to seek help from other sources not listed in the questionnaire from 1 to 7

2.5.2. Independent Variables

There was a total of 10 independent variables measured by four different methods: demographic questionnaire, PHQ-9, SCS, and ASSIS (see Table 3). Three of the independent variables (gender, intimate partner, and religion) were recorded under nominal scale, whereas the remaining independent variable's type was ordinal data.

Table 3. Independent variables. PHQ-9: Patient Health Questionnaire-9; SCS: Social Connectedness Scale; ASSIS: Acculturative Stress Scale for International Students.

Measure	Independent Variables		Type of Data	Description
	Name	Code		
Demographic questionnaire	Gender	"Gender"	Nominal	0 (male) and 1 (female)
	Age	"Age"	Ordinal	Age of respondents
	Length of stay	"Stay"	Ordinal	Length of stay from the time of change
	Japanese proficiency	"Japanese"	Ordinal	From 1 (beginner) to 5 (native)
	English proficiency	"English"	Ordinal	From 1 (beginner) to 5 (native)
	Intimate partner	"InPartner"	Nominal	0 (No) and 1 (Yes)
	Religion	"InReligion"	Nominal	0 (No) and 1 (Yes)
PHQ-9	Depression severity	"Depression"	Ordinal	Depression scores from 0 to 27
SCS	Social connectedness	"SoConnect"	Ordinal	Social connectedness scores from 8 to 48
ASSIS	Acculturative stress	"AccStress"	Ordinal	Acculturative stress scores from 36 to 180

3. Results

3.1. Help-Seeking Behaviors

Table 4 shows the difference of the mean scores and standard deviation (SD) of all variables between domestic and international students. One-way ANOVA was also used to examine the significant differences in socio-demographic characteristics, the main predictors (depression, acculturative stress and social connectedness), and help-seeking sources between two groups of students.

Within socio-demographic characteristics, the differences in English and Japanese proficiencies between international students and domestic students were found to be statistically significant at p -value < 0.001 . To elaborate, international students seemed to speak English more fluently than domestic students, and vice versa for Japanese proficiency. Additionally, international students were also more likely to consider themselves religious than domestic students ($0.373 > 0.238$, p -value < 0.05). As for the main predictors, only the level of acculturative stress was statistically significant at p -value < 0.001 , which means that international students were more likely to possess higher acculturative stress than domestic students ($75.562 > 62.835$).

Table 4. Sample characteristics and group differences between international and domestic students.

Socio-Demographic Characteristics	International Students (N = 201)		Domestic Students (N = 67)		<i>p</i> -Value
	Mean	SD	Mean	SD	
Gender	0.636	0.482	0.626	0.487	0.884
Age	21.029	3.033	20.402	1.661	0.108
Length of stay	2.064	1.375	2.402	1.142	0.070
English proficiency	3.895	0.730	2.910	0.883	0.000 ***
Japanese proficiency	2.522	0.911	4.820	0.601	0.000 ***
Intimate partner	0.393	0.489	0.402	0.494	0.894
Religion	0.373	0.484	0.238	0.429	0.044 *
Main predictors					
Depression	8.044	4.904	8.611	5.116	0.4181
Social Connectedness	37.417	9.131	37.641	9.603	0.863
Acculturative stress	75.562	22.555	62.835	20.236	0.0001 ***
Help-seeking sources					
Formal sources					
Professionals	0.179	0.384	0.179	0.386	1.000
Doctors	0.233	0.424	0.208	0.409	0.675
	0.174	0.380	0.164	0.373	0.852
Informal sources					
Partner	0.348	0.477	0.432	0.499	0.215
Friends	0.532	0.500	0.567	0.499	0.621
Parents	0.442	0.497	0.582	0.496	0.048 *
Relatives	0.462	0.499	0.656	0.478	0.005 **
Religion leaders	0.243	0.430	0.253	0.438	0.870
	0.074	0.263	0.059	0.238	0.6815
Miscellaneous sources					
Phone helpline	0.094	0.293	0.044	0.208	0.200
Alone	0.104	0.306	0.134	0.343	0.504
Internet	0.273	0.446	0.149	0.359	0.039 *
Others	0.198	0.400	0.149	0.359	0.375
	0.094	0.293	0.029	0.171	0.088

*, **, *** are statistically significant at 0.05, 0.01, and 0.001, respectively.

Formal help-seeking sources. There was no statistically significant difference between international and domestic students in formal help-seeking behaviors. Even though the percentage of international students looking to mental health professionals and doctors for emotional help was higher than that of domestic students, the difference was negligible (see Figure 1). Within formal sources, mental health professionals, such as psychologists, social workers, and counsellors, seemed to be a more popular emotional help-seeking source than doctors and GPs among both international students ($23.38\% > 17.41\%$) and domestic students ($20.9\% > 16.42\%$).

Informal help-seeking sources. The percentages of international and domestic students seeking emotional help from informal sources were relatively high (see Figure 2). The three most common sources of help-seeking among domestic students were parents, friends, and intimate partner with 65.67%, 58.21%, and 56.72% respectively, whereas top three help-seeking sources among international students were partner, parents, and friends with 53.23%, 46.27%, and 44.28% respectively. The prevalence of students looking for help from intimate partner, friends, and parents, was

dramatically higher than other two informal sources (family relatives and religious leaders). Overall, a higher proportion of domestic students (43.28%) sought emotional help from informal sources than that of international students (34.83%). Although there was no statistically significant difference in terms of informal sources between international and domestic students, international and domestic students were significantly different in terms of seeking help from friends (p -value < 0.05) and parent (p -value < 0.01).

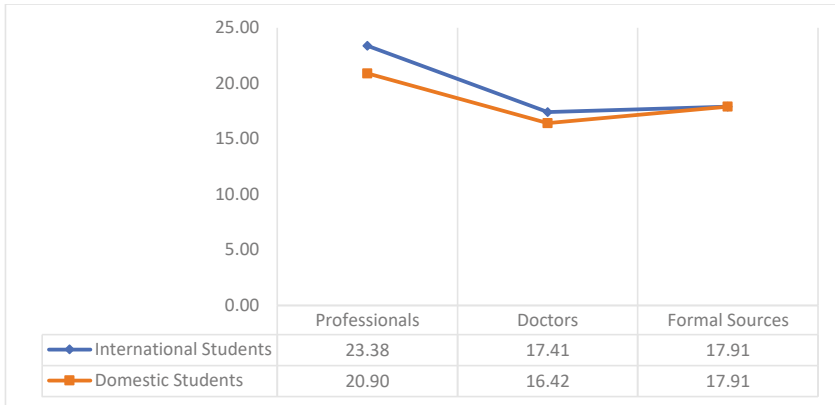


Figure 1. Prevalence of help-seeking from formal sources.

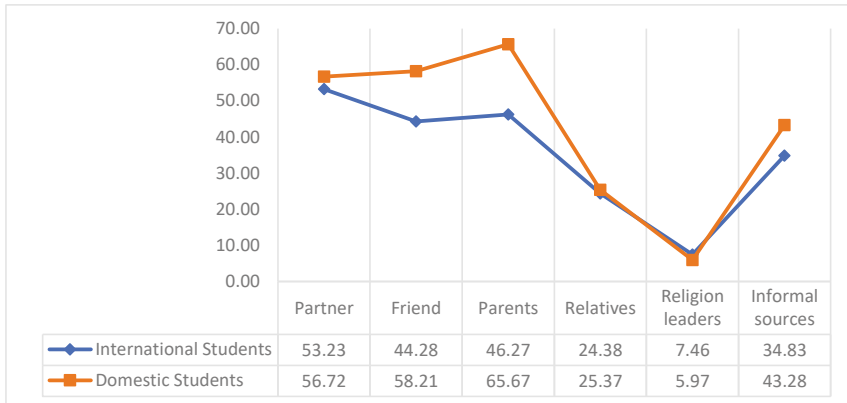


Figure 2. Prevalence of help-seeking from informal sources.

Miscellaneous help-seeking sources. International students (9.45%) were more willing to seek help from miscellaneous sources than domestic students (4.48%). Within the miscellaneous sources, dealing with emotional problems alone and looking for help on the Internet were the two most prevalent options in both international and domestic students (see Figure 3). The number of international students dealing with emotional problem alone, seeking help from the internet and other sources were greater than that of domestic students (27.36% > 14.93%, 17.41% > 14.93%, and 9.45% > 2.99% respectively). In particular, it was found that international and domestic students showed a significant difference in dealing with emotional problems alone (p -value < 0.05). On the other hand, international students were less likely to seek help from phone helpline than domestic students (10.45% < 13.43%).

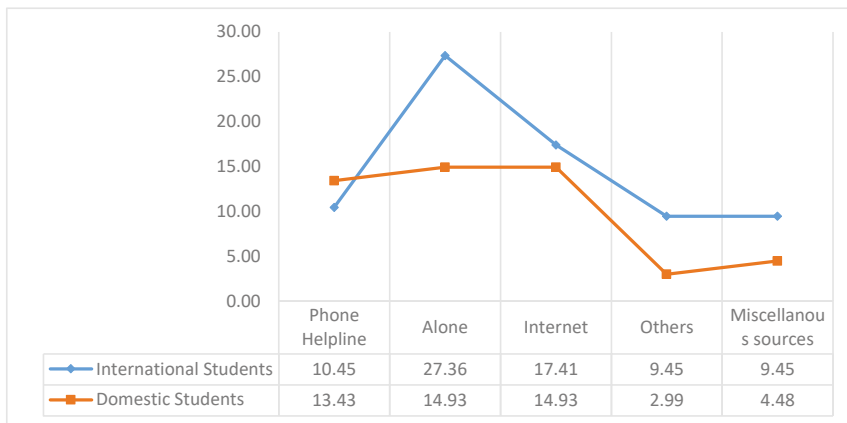


Figure 3. Prevalence of help-seeking from miscellaneous sources.

In general, informal sources were the most prevalent sources of help-seeking behaviors among both international and domestic students. International and domestic students appeared not to have any difference in seeking help from formal sources, but international students were more likely to find help from miscellaneous sources, excluding phone helpline, than domestic students.

3.2. Predictors of Help-Seeking Behaviors

A Pearson correlation test was conducted among independent variables in international and domestic student samples. The highest correlations' coefficients in international and domestic student samples were acculturative stress-social connectedness and length of stay-age respectively. All coefficients of correlations among domestic and international student samples were still in range from -0.7 to 0.7 , so there was no multicollinearity [71,72].

The normality of all dependent variables in international and domestic student samples was tested using Skewness and Kurtosis normality test. In international student samples, four dependent variables ("partner", "friend", "parent", and "informal") were nonnormally distributed, while the Skewness and Kurtosis of six dependent variables in domestic student samples ("formal", "professional", "partner", "friend", "relative", and "informal") also did not indicate normal distribution. Therefore, all nonnormally distributed dependent variables were log-transformed to ensure the normality. Dependent variables being log-transformed were added "log-". For instance, "log-partner", "log-friend", and "log-parent". Transformed variables would be used in the rest of the analysis.

Formal help-seeking sources. The linear regression analysis on dependent variables of formal help-seeking sources was displayed in Table 5. Acculturative stress was a significant predictor of willingness to seek formal help among international students ($\beta = 0.017$, $R^2 = 0.09$, and p -value < 0.01), whereas there was no significant predictor of formal help-seeking behavior in domestic students. Among international students, acculturative stress was also predictive of seeking help from mental health professionals ($\beta = 0.02$, $R^2 = 0.1$, and p -value < 0.01) and doctors ($\beta = 0.014$, $R^2 = 0.06$, and p -value < 0.05) for emotional problems. In other words, international students with high acculturative stress were more willing to find help from formal sources, such as psychologist, counsellor, doctor, or general practitioner, during the stage of emotional difficulty.

Informal help-seeking sources. Table 6 shows the results of linear regression analysis on dependent variables of informal help-seeking sources in both international and domestic student samples. It was found that while depression level ($\beta = -0.023$, $R^2 = 0.12$, and p -value < 0.01) and acculturative stress ($\beta = 0.005$, $R^2 = 0.12$, and p -value < 0.01) may predict the informal help-seeking behavior among international students, level of social connectedness ($\beta = 0.024$, $R^2 = 0.22$, and p -value < 0.001)

and acculturative stress ($\beta = 0.007$, $R^2 = 0.22$, and p -value < 0.01) may predict domestic student's behavior of seeking informal help. In finer scale, international students with higher depression level would be less likely to seek help from parents ($\beta = -0.028$, $R^2 = 0.1$, and p -value < 0.05) and family relatives ($\beta = -0.066$, $R^2 = 0.09$, and p -value < 0.05), and international students possessing high level of acculturative stress might have more intention to seek help from parents ($\beta = 0.005$, $R^2 = 0.1$, and p -value < 0.05) and family relatives ($\beta = 0.018$, $R^2 = 0.09$, and p -value < 0.05). On the other hand, domestic students feeling more connected to surroundings were more likely to find help from their intimate partner ($\beta = 0.042$, $R^2 = 0.39$, and p -value < 0.001), friends ($\beta = 0.033$, $R^2 = 0.25$, and p -value < 0.001), and parents ($\beta = 0.085$, $R^2 = 0.18$, and p -value < 0.05), and high acculturative stress perceived domestic students might seek help from their intimate partner ($\beta = 0.011$, $R^2 = 0.39$, and p -value < 0.05).

Table 5. Predictors of formal help-seeking intentions among international university students.

International Students	Formal	$Formal = 0.017 \times AccStress^{**}$
	Professionals Doctors	$Pro = 0.02 \times AccStress^{**}$ $Doctor = 0.014 \times AccStress^*$
Domestic Students	Formal	No significant results
	Professionals Doctors	No significant results No significant results

*, **, *** are statistically significant at 0.05, 0.01, and 0.001, respectively.

Table 6. Predictors of informal help-seeking intentions among international university students.

International Students	Informal	$log - informal = -0.023 \times Depression^{**} + 0.005 \times AccStress^{**}$
	Intimate partner	$log - partner = 0.169 \times English^*$ $+0.376 \times Inpartner^{**}$
	Friends	$log - friend = 0.142 \times English^*$
	Parents	$log - parent = -0.028 \times Depression^*$ $+0.005 \times AccStress^*$
	Family relatives	$Relative = -0.066 \times Depression^*$ $+0.039 \times SoConnect^*$ $+0.018 \times AccStress^*$
	Domestic Students	Informal
Intimate partner		$log - partner = 0.228 \times English^*$ $+0.395 \times Inpartner^*$ $+0.042 \times SoConnect^{***}$ $+0.011 \times AccStress^*$
Friends		$log - friend = -0.116 \times Age^{**}$ $+0.033 \times SoConnect^{***}$
Parents		$parent = 1.158 \times Gender^* + 0.085 \times SoConnect^*$
Family relatives		$log - relative = -0.166 \times Age^*$

*, **, *** are statistically significant at 0.05, 0.01, and 0.001, respectively.

Even though English proficiency was not a significant predictor variable of informal help-seeking source in general, it could predict the behavior of seeking emotional help from friends ($\beta = 0.142$, $R^2 = 0.06$, and p -value < 0.05) and intimate partner ($\beta = 0.169$, $R^2 = 0.13$, and p -value < 0.05) in international students and from intimate partner ($\beta = 0.228$, $R^2 = 0.39$, and p -value < 0.05) in domestic students. International and domestic students reporting to have intimate partner were more likely to seek help from their intimate partner ($\beta = 0.376$, $R^2 = 0.13$, and p -value < 0.001 and $\beta = 0.395$, $R^2 = 0.39$, and p -value < 0.05 respectively). Age was also a significant predictor of behaviors of seeking help from friends and family relatives among domestic students. More specifically, older students tended not to find help from their friends ($\beta = -0.116$, $R^2 = 0.25$, and p -value < 0.01) and family relatives ($\beta = -0.016$, $R^2 = 0.14$, and p -value < 0.05) for emotional difficulties. Besides age, gender was also predictive of

seeking help from parents among domestic students. Male students were less likely to seek emotional help from their parents than female students ($\beta = 1.158$, $R^2 = 0.18$, and p -value < 0.05).

Miscellaneous help-seeking sources. In term of miscellaneous help-seeking behavior, depression ($\beta = 0.039$, $R^2 = 0.19$, and p -value < 0.05) and acculturative stress ($\beta = 0.014$, $R^2 = 0.19$, and p -value < 0.001) were positively correlated with willingness to seek help in international students, whereas there was no significant variable found among domestic students (see Table 7). Different from informal help-seeking behavior, depressed international students were more probable to find emotional help from miscellaneous source, especially sources that were not listed in the questionnaire ($\beta = 0.066$, $R^2 = 0.13$, and p -value < 0.05). Among international students, acculturative stress was a significant predictor of variety of miscellaneous help-seeking sources which were phone helpline ($\beta = 0.015$, $R^2 = 0.05$, and p -value < 0.01), Internet ($\beta = 0.019$, $R^2 = 0.1$, and p -value < 0.01), and others ($\beta = 0.013$, $R^2 = 0.13$, and p -value < 0.05).

Social connectedness was also an important predictor for several miscellaneous help-seeking behaviors in both international and domestic students. International students with high perceived social connectedness were expected not to try to overcome emotional difficulties alone ($\beta = -0.063$, $R^2 = 0.23$, and p -value < 0.01). Similarly, domestic students with high perceived social connectedness were also less likely to deal with emotional problems alone ($\beta = -0.091$, $R^2 = 0.41$, and p -value < 0.01) and seek help from the Internet ($\beta = -0.071$, $R^2 = 0.23$, and p -value < 0.05). Besides social connectedness, age was also a potential predictor of international and domestic student’s intention to overcome emotional difficulties alone. Younger international students were more probable to overcome emotional difficulties alone ($\beta = -0.095$, $R^2 = 0.23$, and p -value < 0.05). On the contrary, the older domestic students were, the more they wanted to deal with the emotional problems alone ($\beta = 0.367$, $R^2 = 0.41$, and p -value < 0.01). Also, some other sources of help-seeking among domestic students not listed in the questionnaire was predicted by Japanese proficiency ($\beta = 0.533$, $R^2 = 0.25$, and p -value < 0.05).

Table 7. Predictors of miscellaneous help-seeking intentions among international university students.

	Miscellaneous	$Miscell = 0.039 \times Depression^* + 0.014 \times AccStress^{***}$
International Students	Phone helpline	$Phone = 0.015 \times AccStress^{**}$
	Internet	$Internet = 0.019 \times AccStress^{**}$
	Alone	$Alone = -0.095 \times Age^* - 0.063 \times SoConnect^{**}$
	Others	$Other = 0.066 \times Depression^* + 0.013 \times AccStress^*$
	Miscellaneous	No significant variable
Domestic Students	Phone helpline	No significant variable
	Internet	$Internet = -0.071 \times SoConnect^*$
	Alone	$Alone = 0.367 \times Age^{**} - 0.091 \times SoConnect^{**}$
	Others	$Other = 0.533 \times Japanese^*$

*, **, *** are statistically significant at 0.05, 0.01, and 0.001, respectively

In general, the level of depression and acculturative stress were found to be important predictors of formal, informal, and miscellaneous help-seeking behavior among international students, while the feeling of being socially connected and the level of acculturative stress were predictive of informal help-seeking behavior among domestic students.

4. Discussion

By conducting a survey at an international university in Japan, this study is a primary study on the prevalence of help-seeking behaviors and predictors of help-seeking behaviors of students in a multicultural environment. The findings indicate greater prevalence of informal help-seeking behaviors than other types of help-seeking behavior in both international and domestic students.

Moreover, the results also show that depression and acculturative stress are important predictors of help-seeking behaviors among international students, while social connectedness and acculturative stress are predictive of informal help-seeking behaviors among domestic students. Based on the results, the study gives some suggestions for policy implication and improvement.

4.1. Help-Seeking Behaviors

According to this study, seeking help from informal sources was the most prevalent in both international and domestic students at 34.83% and 43.28% respectively, while the percentage of students seeking professional help (psychologist, social worker, or counsellor) was not high, at lower than 18%. The current result confirms the finding of Lindsey et al. that adolescents most often share emotional problems with their family [73]. In addition, the high proportions of international and domestic students seeking help from informal sources show consistency with another study on Japanese college students. Yeh et al. reported that 60% and 40% of students participating in their surveys were more likely to seek help from friends and siblings, respectively [25]. These findings support the *Network Episode Model*, which emphasizes the essentiality of informal sources, such as parents and friends for information, advices, expressive or emotional support, and so on, during times of emotional difficulty [26,74]. Another explanation for the different percentage between seeking help from informal and formal sources is that behaviors are shaped and influence by cultural roots [75]. Most of the participants in this study were from East and South East Asia, where professional mental help was under-developed, mental health was less taken care of, and mental illness treatment sometimes looked down as shameful activities [76]. Thus, Asian students are more willing to seek help from their interpersonal network rather than professional helps [16].

Another finding of this study is that domestic students were more likely to seek help from informal sources than international students, whereas solutions that did not need much interactions with other people, such as finding help from the Internet and dealing with the problem alone, were more preferable among international students than domestic students. It is more challenging for international students to find advices or emotional support from parents or friends [77], as they are studying abroad and many of their family and friends—those from high school, for example—are far away. Moreover, living in a different cultural environment also restrains the ability to make new friends of international students. Assuming support from friends and parents to be a type of mental health support, domestic students would be having more access to help-seeking service than international students. As a result, international students are less likely to seek help from parents and friends and more likely to self-help and seek help from the Internet than domestic students [16,26].

4.2. Predictors of Help-Seeking Behaviors

International students suffering more from acculturative stress are more willing to seek help from all sources: formal, informal, and even miscellaneous. However, among domestic students, the only statistically significant correlation was between acculturative stress and informal help-seeking behavior, especially seeking help from intimate partner (see Tables 5–7). The findings are consistent with other studies in that acculturation is a strong predictor of help-seeking from professional sources among international students [33,34]. Additionally, the current result not only supports the *Andersen Behavioral Model* that help-seeking behavior is influenced by social and structural matters [31], but also points out the importance of interpersonal network in mental health help-seeking [26].

The difference between international and domestic students might result from a lower awareness of acculturative stress among domestic students than international students. This result hints at the overlooked impacts of acculturation on domestic students in a multicultural environment. Besides the benefits of internationalization of education, the renunciation of cultural instinct among domestic students might be inevitable [78]. Internationalization creates a multicultural environment that students in host country can immerse in new cultures and benefit from them. Similar to students from overseas, they also experience an acculturation process [4,79]. During this process, domestic students

need to choose whether to integrate new values into their core values [75], reject contradicted values, or keep it in a compromising zone [80]. If the process does not occur smoothly, when it becomes violent, domestic students might face the risk of acculturative stress, or even depression. It is noteworthy that the risk from acculturation for international students has been widely discussed [7,81–84], but the impact of acculturation on students from host countries seems to be missing in the literature. In fact, globalization—namely, the increasing concentration of international students on campus—might have led to acculturation among domestic students without the need for said domestic students to leave home. This increases the risk of acculturative stress and related mental health issues, especially for domestic students who are unprepared in the face of changes and new types of peer pressure. The phenomenon is fairly new and has not been addressed in the extant literature, considering the fact that the framework laid by Berry [8,9] only treats acculturation for individuals travelling abroad. This eventually suggests the necessity for education policy-planners, when designing help-seeking facilities, guidance and counseling practices, to take into account this finding and reach out more to the domestic students.

The finding in this study also indicates the effect of being depressed on informal help-seeking behaviors among international students. Students reporting higher levels of depression were less willing to seek help from informal sources, especially parents and family relatives. This might have been a result of the fact that most of the participants came from developing countries in Asia, where stigma associated with mental health illness or depression is very severe [85–87]. Students might avoid sharing it with other people as they are afraid of the stigma and shame around having a mental health illness [88]. Another possible cause for this behavioral tendency is that international students might not want to make their family and relatives worry, in other words, students studying abroad are often seen as the pride of their parents or even their whole family, which might make it harder for them to share with people back home.

As expected, social connectedness was predictive of help-seeking behaviors in both international and domestic students. To elaborate, students with high social connectedness were more willing to seek help from informal sources and less willing to overcome emotional difficulties alone. This result confirms the assumption of Lee and Robbins that help-seeking behaviors might be influenced by social connectedness [66]. Moreover, students feeling more socially connected are less likely to deal with emotional difficulties alone, because they could receive support from parents and friends [89].

The impact of socio-demographic factors on help-seeking behaviors was also examined in this study. English proficiency, having an intimate partner, gender, and age were significant predictors of several informal and miscellaneous sources of help-seeking. English proficiency was found to have positive effect on intention to seek help from friends and intimate partner, since it helps students to communicate more coherently and effectively with their friends and intimate partner. Male domestic students were less likely to seek help from parents. Japanese males do not want to express their emotions [90] and are expected to act according to traditional constructs of masculinity [91], so whenever facing emotional difficulties Japanese males are less likely to seek help from their family, specially their parents.

Age was also a significant predictor of help-seeking behaviors in this research, but it showed the opposite effects on international and domestic student samples. Older international students were less willing to deal with emotional problems alone, while older domestic students were more preferable to overcome emotional difficulties alone and less likely to seek help from friends. The correlation between age and willingness for self-help among international students might be hard to explain due to the dynamic of cultural difference, but that among domestic students, it can be explained by Japanese culture. In Japan, a study has found the pressure of “growing up” makes teenagers want to stay alone and isolated and spend more time with their *keitai* (phone) [92]. This might explain the positive association between age and willingness to deal with emotional problems alone and the negative association between age and likeliness to seek help from friends, among domestic Japanese students.

5. Limitations and Recommendations

This study has several limitations. The sampling method of this study is not random sampling; thus, it cannot provide an equal selection chance for everyone, which might potentially lead to bias. Moreover, the mental health conditions were self-reported.

The results of this research should be used as a recommendation and should not be generalized for the following reasons: (1) the difference between the proportion of international and domestic students is large; (2) there are more males than females in the sample; (3) most of the surveyed international students originate from Asian countries. This, in turn, suggests a meta-analysis should be done later for confirmation and generalization such as the following work [93].

Except for depression and acculturative stress, other mental health conditions have not been included in the scope of this study. Further studies could take other types of mental health problems into account, such as anxiety, panic disorder, eating disorder, e.g., [94].

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Article

Toward Sustainable Overseas Mobility of Vietnamese Students: Understanding Determinants of Attitudinal and Behavioral Loyalty in Students of Higher Education

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Abstract: Research on internationalization in higher education has not shed enough light on how cross-border student mobility might contribute to the issue of sustainability. Given that a sustainable movement of loyal international students could help sustain the financial income, ranking, and prospective human resources of the host universities and countries, this study aims to investigate the mechanisms that lead to such loyalty. Specifically, this study adds to the literature by examining how switching cost interacts with disconfirmation and satisfaction in generating attitudinal and behavioral loyalty among international students. The study, surveying 410 Vietnamese students who are studying at either at the undergraduate or graduate level in 15 countries across the globe, first adopts confirmatory factor analysis (CFA) using software SAS 9.3 to evaluate if multiple fit indices, the standardized factor loading, and the average variance extracted scores are satisfactory. It then employs the Structural Equation Model (SEM) to test five hypotheses concerning the interaction between disconfirmation and satisfaction as well as among satisfaction, switching cost and behavioral/attitudinal loyalty. The results find that disconfirmation has both direct and indirect impact, while satisfaction only has a direct impact on attitudinal loyalty. Meanwhile, switching cost is found to have a direct impact on behavioral loyalty, but not on attitudinal loyalty. Based on these findings, the study proposes some theoretical and managerial implications for sustainability in general and sustainability of higher education in particular as well as direction for future studies.

Keywords: international student; higher education; sustainability; student loyalty; Vietnam

1. Introduction

The rise of globalization has resulted in increased cross-border student mobility, fueling the growth of higher education institutions in well-developed nations [1]. While globalization and internationalization are related, they are not the same thing [2]. In the context of studies on higher education and its sustainability, the concept of internationalization in education has been applied in a highly varied fashion throughout history, with its interpretations hinged on the rationales and incentives for such a strategy as well as on the political and economic circumstances in which the process takes place [3]. Yet, what remains rather constant is the role of international students in the internationalization strategies of many higher education providers worldwide [4]. Indeed many studies

have highlighted the importance of international students as it contributes to the sustainability of the host countries and universities in terms of finance [4–7], reputation [8], and human resources [9,10]. In particular, international students have become a significant source of income for the governments and universities of the host countries [4–6]. For example, at the end of the calendar year 2016, Australia had collected 21.96 billion Australian dollars from the contribution of international students, up 17.74% year-on-year [7]. All higher education institutions are also looking to recruit more international students given that several recognized university rankings such as The Times Higher Education (THE) or QS now include the proportion of international students as one of the indicators [8]. Additionally, international students can become skilled workers and help sustain the number of working-age adults in many developed but ageing nations [9,10]. According to Hanson and Slaughter [9], the U.S. offers annually about 20,000 H-1B visas, which subsequently serve as a precondition for green cards in the next step, specifically for postgraduate degree holders from U.S. institutions in the technology sector. Australia is also reportedly looking to international students as a primary source of highly skilled migrants to offset for the country's growing elderly population [10].

The extant literature on international students, such as their recruitment or adaptation, can be divided into three main topics. First, some studies have tried to investigate the push-pull factors driving the outflow of mobilized students from their homelands to overseas [11,12]. Second, other authors have focused on the adaptation process of international students into new countries and new academic environments [13,14]. Third, scholars have even begun to examine how loyalty—and to an extent its sustainability—is formed among international students and their host countries and universities [15,16].

Among the three above streamlines of research, the third one has received the least attention, leaving a gap of understanding on the specific factors that drive the loyalty of international students toward their incumbent host countries and universities. Thus, the objective of this study is to examine how switching cost interacts with disconfirmation and satisfaction in generating attitudinal and behavioral loyalty among international students, and thereby, contributing to the sustainability of the host countries and universities in terms of finance, ranking and human resources. There are three aspects the study will expand on to improve the current knowledge of international student loyalty:

- First, while previous studies on international student loyalty all regarded loyalty from one-dimensional perspective, i.e., loyalty as continued studying intention (behavioral loyalty) or loyalty as positive word of mouth (attitudinal loyalty), the approach of this study is to use dual-dimensional conceptualization of loyalty, i.e., considering loyalty from both attitudinal loyalty and behavioral loyalty.
- Second, this paper incorporates the established model of disconfirmation expectation [17] with the concept of switching cost [18–20] to explain the variation of international student loyalty. As Kim and Son [18] argued that the stability of relationship between customers (e.g., international students) and service providers (e.g., higher education institutions) is hard to be determined without the switching cost, taking into account this factor is necessary. Yet, this concept seems to be ignored in previous studies in international student loyalty.
- Finally, this study discusses how international student loyalty might contribute to the issue of sustainability of the host countries and universities in terms of finance, ranking and human resources.

This paper is organized as follows: the literature review section provides a thorough background to the conceptualization of international student loyalty from the dual-dimensional approach (i.e., attitudinal loyalty and behavioral loyalty) as well as its determinants, including disconfirmation, satisfaction, and switching cost. The next section then draws out the conceptual model and hypotheses, upon which the research methodology is built and the data collection and analysis carried out. The result section presents the empirical findings with interpretations that are consistent with the

proposed conceptual model. This paper ends with the conclusion, in which the limitations and suggestions for further studies are put forth.

2. Literature Review

2.1. Disconfirmation

The first determinant of international student loyalty is generally considered to be disconfirmation [21,22]. This construct originates from the expectation-disconfirmation theory that is widely used in the consumer behavior literature [23–25]. These authors argued that the expectation-disconfirmation model consists of four constructs: expectations, performance, disconfirmation, and satisfaction. If all other factors are equal, customers would be likely to have their positive disconfirmation when their product and/or service performance exceeds expectations or, their neutral disconfirmation if their product and/or service performance equals expectations. On the other hand, their negative disconfirmation should be likely to appear when customers have their product and/or service performance lacks of expectations [26]. Thus, disconfirmation is a difference between expectations and performance, including three scales such as positive, neutral or negative [26].

In the case of international students, their disconfirmation could be related to expectations and performances of tangible components of higher education services, namely lecture halls, student service centers, libraries, laboratories, computer rooms, etc., and intangible components of higher education services such as the availability of lecturers and tutors, their expertise, their teaching methods, their attitudes to students, etc. [21]. As explained by Lankton and McKnight [27] (p. 89), disconfirmation is “a subjective post-usage comparison that can result in one thinking performance was better, the same as, or worse than expected.” Noticeably, disconfirmation plays an independent role with a direct effect on satisfaction [28].

2.2. Satisfaction

Based on the expectation-disconfirmation model, Van Ryzin [25] continued to confirm that disconfirmation has a close relationship with satisfaction. Alternatively, a consumer who has a positive disconfirmation also gains a higher satisfaction. In contrast, he or she gathers a lower satisfaction in case of having a negative disconfirmation [25]. However, if there is a neutral disconfirmation, the customer also receives a neutral feeling of “neither satisfaction nor dissatisfaction” [26] (p. 435). Hence, satisfaction of customers, according to Chih et al. [28], is a pleasant feeling of comparing between their expectation and performance of a product or a service. Consumers who rely on their own experience in positive, neutral or negative disconfirmation stage also provide their own judgment of satisfaction [29]. For examples: international students in Australia pay attention to the satisfactory elements in higher education services, which consist of academic services, access in buildings and facilities, administrative services, augmented services, physical evidence, and courses offered [21] (p. 76). Likewise, international students in the U.S. attribute their satisfaction to: background and pre-college preparation; academic involvement; social involvement; and racial/ethnic diversity involvement [30] (p. 660). More simply, Asare-Nuamah [31] (p. 55) pointed out that the satisfactory dimensions of overseas students in India include the library, contact with teachers and administrative services, class sizes, course/subject content and reading materials. Similarly, in Malaysia, overseas students expressed their satisfaction with: university reputation/image, program quality, lecturers and teaching quality, student learning environment, effective use of technology, counselling and academic advising support, and social life (direct/indirect) facilities provided by the universities [32] (p. 502).

Consequently, international student satisfaction is related closely with international student loyalty because of their post-graduation activities: Alumni registrations, donations, recommendations of their ex-higher educational institutions for prospective students in their home countries, etc. [30].

2.3. Loyalty

As explained by Erjavec [33], the measurement of customer satisfaction itself is not effective if it does not take into account customer loyalty. This is because customer loyalty is expressed as a deep commitment of a customer with the current product or service he or she consumes as well as his or her intention to continue to buy it in the future [34]. Brown and Mazzarol [35] demonstrated that loyal overseas students are willing to: (i) Re-enroll in other courses of the higher education institutions that they have studied previously, despite the competitiveness from other universities; (ii) Enroll in other different delivery modes of courses (online courses, courses by distance learning, etc.); (iii) Refer other prospective students to the educational service quality of universities that they have already studied; and (iv) Provide student needs and expectations feedback to their previous higher education institutions. In studying this phenomenon, Gee et al. [36] suggested dividing the term into attitudinal loyalty and behavioral loyalty, attributing both the attitude and behavior of the customer over a long period of time to his or her loyalty [24].

For attitudinal loyalty, Jani and Han [37] and Kaur and Soch [38] described this in several ways, such as: The encouragement of customers to their relatives and friends to use their loyal products or services; the intention of customers to continue to use these products or services for a long period of time; the willingness of customers to pay a higher price for their loyal brand products or services than others, etc. In the case of international education, the attitudinal loyalty of international students could be a cognitive image of their desired universities, affective assessment of the establishment history and academic reputation of such higher education institutions, conative intention to enroll in their desired courses, etc. [39].

For behavioral loyalty, Oliver [24] suggested counting the final phase in the loyalty formation process: the action stage, i.e., customers act in their own specific ways to gain their desired product or service. Alternatively, in this phase, customers focus on their behavioral actions frequently [40]. Thus, international students might express their behavioral loyalty with practical actions such as their behavioral intentions to engage in their chosen universities (e.g., collecting course brochures and student information, etc.) and purchase behavior (e.g., official enrolling in their desired course(s) and doing fee payment for them, etc.) [39].

2.4. Switching Cost

Switching cost occurs when customers change a product or service provider to another and face significant costs of their switching. In other words, consumers incur a switching cost if he or she has already purchased a product or service and changed his or her mind in alternative products or services [19]. Generally, the costs of switching could be either monetary or non-monetary forms [20].

As specified by Burnham et al. [41], switching costs include three types: First, switching costs which relate to costs of time, effort, risks, evaluation, learning and set up are called procedural switching costs. Second, switching costs that involve costs of benefit and financial losses are considered financial switching costs. Finally, switching costs that are based on the costs of emotional and psychological discomfort can be seen as relational switching costs. By comparison, others also classified switching costs into psychological switching costs and economic switching costs [42] or learning costs, transaction costs and artificial costs [43].

Regarding the switching cost in higher education, Pham and Lai [44] (p. 3) initially confirmed that “higher education, especially international higher education, is an extended education service.” Thus, international higher education switching cost appears when international students have experienced a longer study period than usual as an extended education service. Therefore, the popular switching costs that international students have incurred might include the cost of learning, cost of finance, and cost of psychological discomfort in universities, etc. [42]. However, many overseas students naturally accept such switching costs and continue to study without changing their universities because of some reasons as: (i) They have studied in higher education institutions for several years and initially perceived the teaching methods of professors/lecturers and acquired the learning methods for

students effectively [45,46]; (ii) They have built some student networks with other students in the same or other institutions for academic and recreational purposes [47]; (iii) They have been familiar with the study environment and the student life in their current institutions [48,49]; (iv) They have created good relationships with their colleagues, landlords, housemates, part-time/casual job employers and work rosters, etc. for everyday study and work [50–52]; etc. Consequently, many international students practically have not wished to change their current study and living conditions as an intentional acceptance of their switching costs in international higher education [53].

2.5. Higher Education and Sustainability

Education in general and higher education in particular as well as their relationships with sustainability are not new research issues. However, within the extant literature, we might find different approaches to conceptualize and investigate the topic. Studies in the 1970s–1990s focused on examining the role of environmental education and its impact on sustainable development [54]. While there are still researchers looking at education from the lens of environment and sustainability in the decade of 2000s [55], this period witnessed a new streamline of other authors viewing education, higher education and sustainability from different perspectives such as sustainability and lifelong learning [56], sustainability and e-learning [57], and the education of sustainability [58].

The first decade of the twenty-first century marked an important milestone for the emergence of the topics education and sustainability to the main discourse, thanks to the UN's approval to include education as one of the Sustainable Development Goals (SDGs) [59]. In particular, the SDGs put inclusion and quality of education as well as lifelong learning at the center of sustainable development worldwide. Following these goals, several authors have investigated different options that education can contribute to sustainable development. For instance, Daniela et al. [60] inquired into “what extent and how technology-enhanced learning can effectively add to teaching and learning, and, consequently, to the imperative of quality education and sustainable growth and development” (p. 2).

Yet, there appears to be a dearth of research on the connection between international students and sustainability. To fill in this gap, this study argues that behavioral loyalty and attitudinal loyalty of international students are important antecedents of the sustainability of the host countries and universities. The reasons hinge on the peculiar status of these international students and the relationships they have with the host universities and countries. In terms of finance, international student loyalty is believed to make the income sources of higher education institutions more sustainable due to the increase in their self-financing ability [4–7] as well as the decrease in the dependence of the State or Federal budget supports [61]. In terms of educational reputation, thanks to the behavioral loyalty of international students, their host countries and universities could continue to attract more overseas students, at both the national and institutional levels. The higher proportion of international students could help the host countries and universities sustain their positions in higher education rankings such as the U21 Ranking of National Higher Education Systems and the THE [8]. Moreover, in terms of human resources value, the behavioral loyalty of international students would play an important role in determining their tendency to stay back or leave the host countries after graduation. For students who have obtained high degrees and skills valuable to the host countries, their employments could add to the overall sustainability of the local workforce. Last, while the attitudinal loyalty of international students may not contribute directly to the sustainability of their host environment, it may have indirect effect. Studies have shown that mouth referral, often by international alumni, is one of the most productive forms of promotion for studying abroad [12,62]. Students who exhibit attitudinal loyalty would be more likely to persuade their friends, colleagues, or family members to study at their incumbent universities. For example, a survey among 139 overseas students in Brisbane, Australia found that two thirds of the respondents had influenced other persons from their home country to study in Australia [63]. This would no doubt contribute indirectly to the financial and reputational sustainability of said schools and countries. Along this line, it is highly

possible that attitudinally loyal students would keep in touch with their former professors for further collaboration or return to the host countries for work at a different time.

The research topic at hand is also relevant to reaching the United Nations' SDGs, particularly the SDG4 on Education [64]. University leaders and policymakers who are aware of the attitudinal and behavioral loyalty of international students, in this context, from Vietnam, can encourage this group to get more engaged with the educational experiences. The students will be driven to accumulate the "technical and vocational skills, for employment, decent jobs and entrepreneurship" (target 4.4 of the SDG 4) and the more "knowledge and skills needed to promote sustainable development" (target 4.7 of the SDG 4) [64]. At the same time, thanks to their higher degrees and advanced skills, international students will gain increased mobility in their employment options, with some returning to their home countries to work. This move would nonetheless contribute to the fulfillment of target 4.C of the SDG 4 ("supply of qualified teachers"). In this sense, the sustainability aspect is ensured regardless of the extent to which international students are loyal to their host environments.

Given these reasons, the next section will delve into the framework and analysis to explicate the drivers of international student loyalty.

3. Conceptual Framework

Within the scope of this study, the conceptual framework will cover four factors, namely disconfirmation, satisfaction, loyalty, and switching cost. After the analysis, the study will tie the discussion to the overall issue of sustainability, as explained above.

Previous studies have investigated that disconfirmation affects satisfaction significantly. For instance, Schwarz and Zhu [65] demonstrated that the expectation-disconfirmation theory [29] influences satisfaction in the international student context, because exceeding international students' expectations will lead to the appearance of their disconfirmation positively and increase their satisfaction. Similarly, Huang [66] suggested that international students might heighten their satisfaction by improving their learning performances or decreasing their expectations. Thus, the first hypothesis is as follow:

Hypothesis 1 (H1). *Disconfirmation influences satisfaction positively.*

Next, Naderian and Baharun [67] argued that many previous studies confirm the positive relationships between satisfaction and attitudinal and behavioral loyalty under various product and service settings, including international higher education service. For instance, Yu and Kim [61] specifically pointed out that international student satisfaction in higher education institution services impacts on international student loyalty positively. Similarly, Pham and Lai [44] (p. 3) also argued that satisfaction of overseas students is a "direct determinant of loyalty" in the international higher education setting "as an extended duration service." Hence, the second and third hypotheses of international student loyalty are proposed as follows:

Hypothesis 2 (H2). *Satisfaction influences attitudinal loyalty positively.*

Hypothesis 3 (H3). *Satisfaction influences behavioral loyalty positively.*

Many previous studies attempted to verify the relationship between switching cost and customer loyalty in various contexts with some similarities and differences in their findings and discussions [68–70]. For example, Yen [70] explained that in some U.S. e-commerce markets, switching cost influenced customer loyalty positively. By comparison, Ram and Wu [69] argued that switching cost by itself had no influence with customer loyalty in Chinese mobile phone market and required further research to clarify the role of switching cost in other settings. Additionally, Ghazali et al. [68] examined that the relationship between customer satisfaction and customer loyalty in e-retailing and country clubbing was not moderated significantly by switching cost.

As a consequence, many studies have further investigated the relationship between switching cost and customer loyalty by dividing loyalty into attitudinal loyalty and behavioral loyalty [71]. For instance, Nettet and Helgesen [71] discovered that in the airport service setting, switching cost influence customer loyalty positively, but weakly. By contrast, Cheng [72] confirmed that switching cost influence customer loyalty significantly in both attitudinal and behavioral loyalty aspects. For example, Ali and Ahmed [53] debated that switching cost has been a vital antecedent of higher education student loyalty. Unfortunately, so far switching cost has rarely used to justify the international student loyalty in the higher education context. Meanwhile, the influence of switching cost on the international student loyalty significantly in both attitudinal and behavioral loyalty might create competitions intensely among higher education institutions [53]. These arguments above suggest the fourth and fifth hypotheses:

Hypothesis 4 (H4). *Switching cost influences attitudinal loyalty positively.*

Hypothesis 5 (H5). *Switching cost influences behavioral loyalty positively.*

With That Said, the Conceptual Framework for This Study Is Visualized in Figure 1.

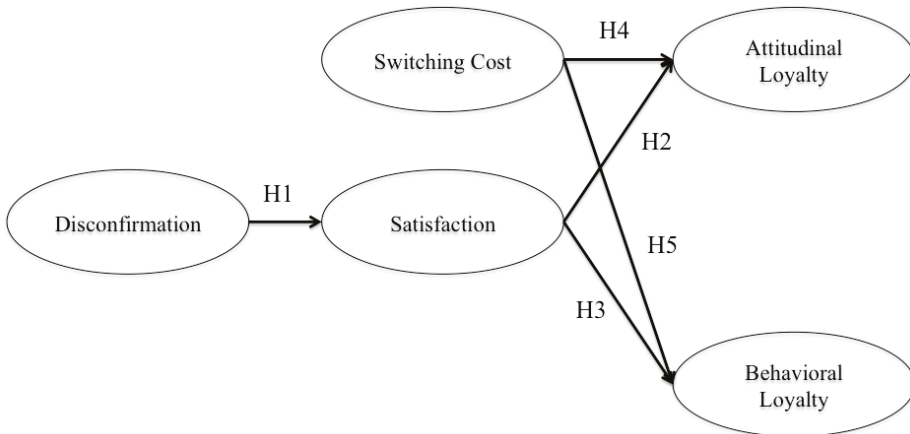


Figure 1. Conceptual model.

4. Materials and Method

4.1. Survey Questionnaire Development

The survey questionnaire is composed of two parts: The first aims to collect the demographic and basic profiles of respondents, including: gender, age, the current host country, current study program, major, the language of instruction in the current study program. The results are presented in Table 1. In the second part, the study addresses questions to measure latent variables introduced in the conceptual model. All questions are adopted from previous highly cited measurements. On the basis of feedback: (i) from two experts, one in education and another in marketing fields; and (ii) a pilot test with 50 respondents, in which some necessary adjustments were made in terms of terminology in order to fit with international higher education settings and some items were eliminated due to their low factor loadings (see Table 2).

Common method variance might be a concern for studies using survey data from same-respondent replies, such as in the study by Huang [66]. Following the suggestion of Chang et al. [73], both Likert scales 5 and 7 were used and some questionnaire items are in reversed-code. These steps aimed to prevent the problem of common method variance.

Table 1. Demographic and basic information of respondents.

Characteristics	Respondents	
	Frequency (n = 410)	%
Gender		
Male	177	43
Female	233	57
Age		
Under 20	18	4
From 20 to 25	146	36
From 25 to 30	146	36
From 30 to 35	69	17
From 35 to 40	23	6
Over 40	8	2
Current host country		
Major English-speaking countries (Australia, Canada, New Zealand, UK, US)	208	50.7
Other countries	202	49.3
Current study program		
Bachelor	81	20
Master and PhD	314	77
Others	15	4
Major		
Science, technology, engineering, and math	111	27
Economic, business, management, education, pedagogy, foreign language, linguistic, social science, and humanities	271	66
Others	28	7
The language of instruction in the current study program		
English	372	91
Others	38	9

Table 2. Results of multiple fit indices.

Index	Result	Acceptable Level
Chi-square	70.49	-
Degree of freedom	55	-
Chi-square/ Degree of freedom	1.28	<5
GFI	0.97	>0.9
AGFI	0.96	>0.8
NFI	0.96	>0.9
RMSEA	0.03	<0.08
BCFI	0.99	>0.9

4.2. Data Collection

Vietnamese overseas students are selected as participants of this study. Vietnam is one of the most dynamic sources of international students, according to Choudaha and Kono [74]. Available data in 2016 showed that there were around 130,000 Vietnamese students, both self-funded and scholarship-received, studying in foreign countries [75]. Traditionally, Vietnamese students went to higher developed countries, such as the U.S., the UK, Australia, Japan, and continental European countries seeking for foreign degrees. More recently, neighboring countries such as Mainland China, South Korea or Taiwan ROC have been increasingly selected by Vietnamese students and parents thanks to their geographical proximity and cheaper costs of tuition fees and living expenses. Meanwhile, former Soviet bloc countries such as Russia or Poland are still receiving a stable number of Vietnamese students thanks to their former ideological affinity.

The study chose two Facebook-based groups gathering Vietnamese overseas students to collect data. A personal solicitation message was sent to 2000 members randomly picked from these two groups from December 2016 to April 2017. First, the reader was asked whether he or she has the plan to undertake further study, including bachelor, master, Ph.D., or post-doc when he or she finishes his or her current program. The reader would only be asked to step into the main questionnaires if his or her answer is “yes”.

Eventually, 410 respondents out of 2000 (or 20.5%) from more than 15 countries across the globe had been validated for the use of data estimation. For 1590 others, 1539 did not answer our questionnaires and 51 others answered but were eliminated due to their incomplete answers. Table 1 represents the demographic and basics profiles of our 410 respondents whose answers were used for data estimation.

5. Results

5.1. Measurement Validation

For measurement validation, confirmatory factor analysis (CFA) was firstly adopted, using software SAS 9.3. In Table 2, we showcase the results of our multiple fit indices, including chi-square, degree of freedom, goodness of fit (GFI), adjusted goodness of fit (AGFI), normed fit index (NFI), root mean square error of approximation (RMSEA), and Bentler comparative fit index (BCFI). As indicated in Table 2, all multiple fit indices obtained from our estimation are satisfactory.

The items' standardized factor loading, construct reliability (CR), and average variance extracted (AVE) scores are selected to access whether convergent validity is problematic for this study. As indicated in Table 3, all factor loadings for individual items are higher than 0.7 (except SAT3, SWC1 and ALO1's are higher than 0.5). According to Evanschitzky et al. [76], minimum acceptable level of standardized factor loading is 0.5 and the preferred level is 0.7. As indicated in Table 4, all CRs and AVEs are satisfactory, as their scores are all higher than cutoff points (0.7 and 0.5, respectively). Finally, since our estimation indicated that AVE scores are higher, the correlations between the latent variables, discriminant validity are demonstrated as not a problem for our study.

Table 3. Results of factor loading for Confirmatory Factor Analysis.

Items	Factor Loading	t Statistic
Disconfirmation: Likert scale 7 [77]		
DIS1: Your experience with studying at the current university and living in the current host country is worse than what you expected before (<i>reverse code</i>)	0.88	36.78 ***
DIS2: The education provided by your current university and the living conditions and environments provided by your current host country is better than what you expected before	0.88	36.51 ***
Satisfaction: Likert scale 7 [77]		
Overall, how do you feel about the service provided to you by your current university and the life in the current host country?		
SAT1: Satisfactory	0.86	38.80 ***
SAT2: Pleased	0.83	36.35 ***
SAT3: Contented	0.67	21.17 ***
Switching Cost: Likert scale 5 [78]		
SWC1: Generally speaking, the costs in time, money, effort, and grief to switch from your current host country to another country for further study would be high	0.57	4.42 ***
SWC2: Overall, you would spend a lot and lose a lot if you switched from current host country to another country for further study	0.78	4.54 ***

Table 3. Cont.

Items	Factor Loading	t Statistic
Behavioral Loyalty: Likert scale 7 [79]		
Rate the PROBABILITY that you would MOVE to another foreign country for further study (<i>reverse code</i>)		
BLO1: Likely	0.83	36.74 ***
BLO2: Probable	0.92	46.47 ***
BLO3: Certain	0.73	26.95 ***
Attitudinal Loyalty: Likert scale 5 [80]		
ALO1: You will say positive things about universities in the current host country to other people	0.69	22.63 ***
ALO2: You will recommend the current host country to someone seeking your advice for education service	0.90	43.61 ***
ALO3: You will encourage your friends/relatives to study in the current host country	0.80	32.17 ***

Note: *** $p < 0.001$.

Table 4. Convergent and Discriminant Validity.

Construct	CR	AVE	Factor Correlation				
			DIS	SAT	SWC	BLO	ALO
DIS	0.87	0.77	1				
SAT	0.83	0.63	0.61	1			
SWC	0.63	0.47	0.02	0.02	1		
BLO	0.87	0.70	0.51	0.02	0.19	1	
ALO	0.84	0.64	0.05	0.49	0.01	0.02	1

Note: DIS: Disconfirmation; SAT: Satisfaction; SWC: Switching Cost; BLO: Behavioral Loyalty; ALO: Attitudinal Loyalty.

5.2. Model Testing

The Structural Equation Model (SEM) was employed to test the proposed hypotheses in this study. Table 5 and Figure 2 present the results of our data estimation. Specifically, all multiple fit indices, including chi-square, degree of freedom, goodness of fit (GFI), AGFI, NFI, comparative fit index (CFI), RMSEA, and BCFI, as shown in Table 5, demonstrate the appropriateness between the conceptual model and the empirical data. Regarding path analyses, among the five hypothetical paths, three were supported with empirical results while two were not. Therefore, H1 (Disconfirmation–Satisfaction), H2 (Satisfaction–Attitudinal Loyalty) and H5 (Switching Cost–Behavioral Loyalty) were confirmed and H3 (Satisfaction–Behavioral Loyalty) and 4 (Switching Cost–Attitudinal Loyalty) were not. In addition, based on modification index results, a new path from Disconfirmation to Attitudinal Loyalty was revealed. In terms of variance explained, 31.41% variance of Attitudinal Loyalty is explained by our model, the corresponding figures for Behavioral Loyalty and Satisfaction are 4.1% and 37.33%, respectively.

Table 5. Results of Structural Equation Model.

	β Coefficient	t Value	Hypothesis
Dependent variable: Satisfaction			
Disconfirmation	0.61	15.56 ***	H1 supported
R ²	37.33%		
Dependent variable: Behavioral Loyalty			
Switching Cost	0.19	2.82 **	H5 supported
Satisfaction	0.07	1.00	H3 not supported
R ²	4.10%		
Dependent variable: Attitudinal Loyalty			
Switching Cost	0.00	0.01	H4 not Supported
Satisfaction	0.28	4.30 ***	H2 supported
Disconfirmation	0.34	5.25 ***	Newly revealed path
R ²	31.41%		

Chi-square = 70.92; degree of freedom = 52; goodness of fit (GFI) = 0.97; adjusted goodness of fit (AGFI) = 0.95; normed fit index (NFI) = 0.97; root mean square error of approximation (RMSEA) = 0.03; and Bentler comparative fit index (BCFI) = 0.99. ** $p < 0.01$; *** $p < 0.001$.

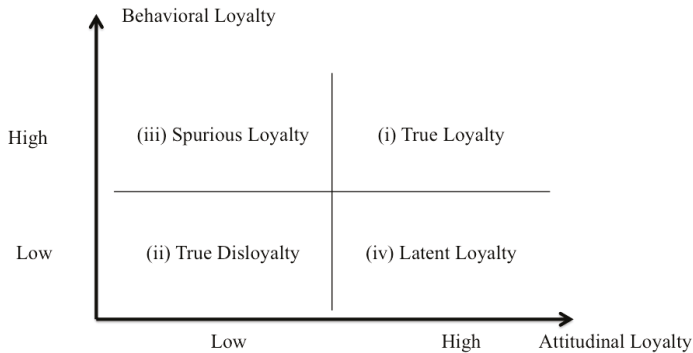


Figure 2. Four clusters of international student loyalty. Source: The authors adopted and adjusted from [81].

The confirmation of H1 (Disconfirmation–Satisfaction) and H2 (Disconfirmation–Attitudinal Loyalty) is in line with several previous studies, which also employed the disconfirmation–expectancy model in different settings e.g., tourism [82], haircut service [83]. In higher education, particularly, Casidy and Wymer [84] surveyed 948 Australian students and also reached a similar result regarding the path from Satisfaction to Attitudinal Loyalty with this study. Thus, the more international students perceive their actual educational performance to have exceeded their expectations, the more satisfied they are, and thus, the more loyal they become regarding attitudinal dimension. In the example of Australian students, one suggestion is the host universities should have a better understanding of the students’ expectations prior to enrollment, upon which they could build programs to meet the students’ demand and satisfaction.

However, our empirical results indicated that there is no significant impact of Satisfaction on Behavioral Loyalty (H3). There are two possible ways to explain this finding. First, as Mittal and Kamakura [85]’s finding shows, the satisfaction–behavioral loyalty might not be a linear relationship, but non-linear. This does mean that Satisfaction still influences positively on Behavioral Loyalty but not in a linear pattern. Given that the method used in this study (SEM) is only workable with linear estimation, rejection of H3 is plausible. Second, an alternative explanation for this finding stems from a proposition of Oliver [24]. In his conceptual work, Oliver [24] asserted that high satisfaction would not universally and necessarily translates into loyalty. Among identified reasons that obstruct loyalty, change in need is a common reason. For instance, as a child grows up, his or her old toys

may not match with the new demand for the new development's pace. In this circumstance, although he or she may still like the toy (high attitudinal loyalty), he or she eventually does not play with it (low behavioral loyalty). In the same vein with this above situation, it is likely that an international student, after finishing his or her first degree overseas, still has high attitudinal loyalty toward his or her current host country; but as he or she changes the need and does not want to stay in the same country for further study anymore. In other words, in both two above cases, as a consumer (a child consuming toy or a student consuming overseas education) has matured; his or her high satisfaction does not automatically translate into behavioral loyalty (re-play the toy or stay in the same country for further study). A similar phenomenon was also observed within working organization. Mosadeghrad et al. [86], in a study with 629 employees of a hospital in Iran revealed that there is a positive association between the degree of staff's satisfaction and their turnover intention. This may be due to a need for change in which the more satisfied an employee is, the more likely he or she changes his/her need, and thus the more likely, he or she wants to quit his/her incumbent job.

Regarding the association between Disconfirmation and Attitudinal Loyalty, as mentioned earlier, we have revealed a new direct path starting from Disconfirmation and ending at Attitudinal Loyalty. This finding, indeed, is consistent with the certain existing literature in relationship marketing in general. For instance, Martínez Caro and Martínez García [87] also found a significant direct impact of disconfirmation of loyalty in sports event context. Considering this empirical result, it is suggested that within the international higher education context, not only does disconfirmation play a role of the indirect antecedent of loyalty but also a direct one.

As discussed earlier, given the special attributes of higher education service, switching cost should be considered as a key determinant of student loyalty. In addition, our data estimation demonstrated partly the hypothesized role of switching cost. In particular, switching cost was found to have a significant impact on behavioral loyalty, but not attitudinal loyalty.

6. Discussion and Conclusions

This study contributes to the scant literature on the loyalty of international students and its antecedents. Specifically, this study incorporates components of the disconfirmation-expectation model with switching cost into a framework to predict and explain two sub-dimensions of international student loyalty: attitudinal loyalty and behavioral loyalty of international students. The implications of the two components of loyalty are clear: a sustainable movement of loyal international students would contribute to the sustainability of the host countries and universities in terms of finance, ranking and human resources.

6.1. Theoretical Implications

The findings, evoked from a survey conducted with 410 Vietnamese overseas students from over 15 countries across the world, demonstrated that components of the disconfirmation-expectation model, including disconfirmation and satisfaction, are significant determinants of attitudinal loyalty, but not behavioral loyalty. Specifically, our empirical results showed that disconfirmation has both direct and indirect (via satisfaction) impact while satisfaction has only direct impact on attitudinal loyalty. Meanwhile, switching cost is found to have a direct impact on behavioral loyalty, but not on attitudinal loyalty. These findings imply that the mechanisms leading to two sub-dimensions of loyalty (i.e., attitudinal and behavioral) might be different. In other words, an international student having high behavioral loyalty toward his or her incumbent host country does not necessarily have high attitudinal loyalty, and vice-versa. On the basis of this assertion and on the basis of Backman and Crompton [81]'s typology, it would be possible to divide international students into four clusters with different loyal behaviors. These are (i) True Loyalty: (international) students demonstrate their high degree of behavioral loyalty, as well as psychological bonding (attitudinal loyalty) toward their current host countries and universities (ii) True Disloyalty: (international students) showcase contrast features to the high loyalty; (iii) Spurious Loyalty: students have the intention to continue to study at

the current host countries but with low level of attachment (low attitudinal loyalty) and (iv) Latent Loyalty: individuals prefer to stick with their current host countries but have the intention to switch due to certain situational factors.

6.2. Managerial Implications

The findings revealed that attitudinal loyalty and behavioral loyalty are formulated in two different ways. As discussed in the literature review, attitudinal loyalty and behavioral loyalty of international students are direct and indirect drivers of sustainability in terms of finance, ranking and human resources for host countries and universities, the results confirm again that there are two strategies to enhance sustainability, one pertaining to the attitudinal component of loyalty and the other to the behavioral counterpart.

First, to enhance attitudinal loyalty, and hence, contribute indirectly to sustainability, policymakers and university leaders might focus on the effort to enhance disconfirmation and subsequently the satisfaction of international students. To do so, policymakers and universities' leaders might focus on evaluating the gaps between the actual performance and prior expectations (i.e., two constituents that make disconfirmation) of their international students. One step to take is surveying the expectations and desires of newly enrolled international students, upon which a periodic evaluation of their actual perception should be carried out. On a practical note, from an entrepreneurial perspective, universities should stay abreast of the current movements in taking advantage of algorithms and the increasingly networked world [88] to effectively implement such surveys among international students. Based on this comparison, responsive actions and adjustments might follow up, helping to build students' attitudinal loyalty over time.

Second, to enhance behavioral loyalty, and thus, result in direct sustainability, policymakers and university leaders are advised to put efforts on enhancing the switching cost. Providers in other service settings have employed several actions to enhance the switching cost. For instance, in the airline service, airline firms often use membership cards as the measurement to raise the switching cost among customers, thus enhancing behavioral loyalty [89]. In the same vein, higher education providers might introduce similar membership programs for their international students, such as those who undertake their second degrees at the incumbent universities would get tuition reduction or waiver.

Here, given that the study uses Vietnam-specific data, it is important to note that international institutions seeking to recruit more Vietnamese students and retain their loyalty should also look into their cultural dimensions [90,91] as well as behaviors [92]. In seeking to raise the loyalty of overseas Vietnamese students, international admissions offices and university leaders should understand the complexity of their socioeconomic background as well as the cultural-religious influences. For instance, to enhance the overall loyalty of Vietnamese students and encourage them to contribute more to the overseas environment, the host institutions should support the building of a tight Vietnamese community locally, through which the students themselves will gain trust and satisfaction in the universities. The behavioral loyalty of Vietnamese students at international schools will result in widespread exchange of information and word-of-mouth referrals about their higher education experience among their existing network of friends and family members. The host universities and countries will therefore benefit directly as their reputation is enhanced.

6.3. Limitations and Recommendations for Future Research

Future studies might have several areas for research based on limitations of this study. First, although the participants in this study cover over 15 countries across the world, they are somewhat biased in terms of the educational level. As indicated in Table 1, 77% of participants in this study are at the graduate level. This figure is, indeed, reasonable as the two Facebook groups that the survey was delivered gathered mostly graduate students. However, this might not reflect the actual profile of the Vietnamese overseas students' population. Other authors might overcome this limitation by selecting sample balancing between undergraduate and graduate students.

Second, although the idea that classifies international students into four clusters i.e., true loyalty, true disloyalty, latent loyalty, and spurious loyalty as explained in the theoretical implication, is interesting, this study could not identify attributes and behaviors pertaining to each cluster. It is because the antecedents included in this study are not enough to explain all the variations of the two exogenous variables i.e., attitudinal loyalty and behavioral loyalty. Future studies might build a more comprehensive model than this one, and thus, attributes of international students corresponding with each above cluster might be identified. Several implications in terms of theory and practice could be drawn once these attributes are outlined, with no doubt.

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