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Future of Undergraduate Education for Sustainable Development Goals: Impact of Perceived Flexibility and Attitudes on Self-Regulated Online Learning

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Abstract: The COVID-19 pandemic accelerated the adoption of online learning, particularly in higher education institutions. This shift underscores the importance of sustainable education practices aligned with the United Nations' Sustainable Development Goals (SDGs). SDG 4 emphasizes inclusive and equitable quality education, highlighting how online learning environments can enhance accessibility and flexibility for students worldwide. SDG 9 underscores the role of technological advancements in education. SDG 10 focuses on reducing inequality within and among countries, and online education can bridge educational disparities by offering flexible learning options to diverse socioeconomic backgrounds. SDG 17 emphasizes the importance of partnerships, which have been crucial in developing effective online learning solutions. This study investigates the relationship between undergraduate students' self-regulated online learning, perceived flexibility, and attitudes towards the use of distance learning environments at a state university in İzmir, Türkiye. Utilizing a survey-type correlational research model, data were collected from 300 undergraduate students. The results indicate that undergraduate students exhibit high-level self-regulation, perceive moderate flexibility, and hold positive attitudes towards the use of distance learning environments. The analysis showed that self-regulated online learning is moderately correlated with perceived flexibility and strongly correlated with attitudes towards the use of distance learning environments. These findings suggest that both perceived flexibility and positive attitudes towards the use of distance learning environments play important roles in predicting self-regulated online learning. This research provides valuable insights for educators and institutions aiming to enhance the online learning experience by promoting self-regulated learning behaviors and flexible learning environments.

Keywords: self-regulated learning; flexibility in education; attitudes towards distance learning; online learning environments; student engagement



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1. Introduction

As a result of the COVID-19 pandemic, online learning has become mandatory from preschool to higher education. Higher education is seen as having more familiarity of online learning than lower levels of education. Online platforms and learning resources are being developed to assist higher education students with the spread of computers and the internet. Web 2.0 platforms, which allow for greater learner participation, are used as support tools in a variety of contexts. The global pandemic has accelerated the integration of many higher education institutions, allowing for online learning platforms to become more widespread.

Learners in online education environments can be considered more autonomous and independent in the learning process when compared to traditional education [1]. They can self-regulate by observing various strategies, feedback, and explanations in these environments [2]. Self-regulation is defined as the ability to monitor, direct, and manage the behavior of adult learners who are expected to act autonomously and independently [3].

Learners with self-regulation skills are said to be included in the cyclical process of setting goals, selecting strategies, and achieving these goals [4]. They should conduct and investigate their understanding, motivation, and learning strategies as they work toward becoming self-regulated learners [5]. Open education platforms, learning management systems, and massive open online courses, among other educational environments, have the potential to promote self-regulated learning [6]. Motivational beliefs, behaviors, and metacognitive activities used by the learner to achieve personal goals are stages of self-regulated learning [7]. In self-regulation, it is accepted that thoughts and feelings are just as important as actions in achieving academic goals [8]. Learners' course satisfaction and attitudes toward online learning improve as a result of their online learning experiences [9].

The COVID-19 pandemic has accelerated the adoption of online learning across all levels of education, with a particular focus on higher education institutions. This shift has underscored the importance of sustainable education practices that align with the United Nations' Sustainable Development Goals (SDGs). SDG 4 emphasizes the need for inclusive and equitable quality education, highlighting how online learning environments can enhance accessibility and flexibility, providing opportunities for students worldwide [10]. Self-regulated learning, a crucial aspect of successful online education, empowers students to take charge of their learning processes, promoting autonomy and independent learning skills essential for lifelong learning [11].

Furthermore, SDG 9 emphasizes the role of technological advancements in education, particularly in building resilient infrastructure and fostering innovation. The rapid development and implementation of Web 2.0 platforms during the pandemic have showcased how innovative technologies can enhance learning experiences, contributing to more resilient and adaptable education systems [12]. Additionally, SDG 10, which aims to reduce inequality within and among countries, is integral to discussions around online learning. Online education can bridge educational disparities by offering flexible learning options accessible to students from diverse socioeconomic backgrounds, thereby promoting social equity [13].

Partnerships, as highlighted in SDG 17, have played a crucial role in the global shift to online learning. Increased collaboration among educational institutions, technology providers, and governments has been essential in developing and implementing effective online learning solutions. These partnerships have facilitated resource sharing, technological advancements, and innovative educational practices, ensuring that the benefits of online learning are widely distributed and sustained [13].

1.1. Self-Regulated Online Learning

Self-regulated online learning refers to the process in which learners actively engage in their own learning progress by monitoring, directing, and managing their motivation, cognition, and behavior to achieve their learning goals in online environments [14]. This concept involves learners systematically activating and sustaining their cognitive, motivational, behavioral, and affective processes towards goal attainment [15]. Learners in self-regulated online learning environments exhibit behaviors such as task analysis, self-observation, self-reaction, self-control, and self-motivational beliefs, which contribute to fostering open communication, group cohesion, and learning self-efficacy in online settings [16].

Self-regulated learning skills and strategies develop iteratively, with students adjusting their behaviors based on feedback and evaluations of the effectiveness of their strategies [17]. Learners who are self-regulated take responsibility for defining their learning goals, directing their emotions, thoughts, and behaviors towards achieving these goals [18]. Self-regulated learning behaviors, including goal setting, planning, and self-monitoring, are identified as key predictors of academic achievement [19].

It seems that self-regulated learning—which entails actively controlling motivation, cognition, and behavior in order to achieve learning objectives—is essential for undergraduate students participating in online courses [20]. Key behaviors fostering open communication, group cohesion, and the development of self-efficacy include task analysis,

self-observation, self-reaction, self-control, and self-motivational beliefs [21]. Continuously developing these skills in the setting of undergraduate courses, students improve their behavior in response to feedback [22]. For undergraduate students, goal setting, planning, and self-monitoring are crucial indicators of academic success [23]. Undergraduate students need to use techniques like learning independently, creating educational plans, scheduling their time, and engaging in self-motivation practices [24]. Teachers need to be aware of how students' anxiety levels are affected by their preparedness for online learning [25]. To sum up, the ability to learn independently online is essential for achieving academic success in online education. Learning outcomes and engagement in online courses can be improved by helping them to develop self-regulated skills for learning, define clear goals, and manage learning processes well.

1.2. Perceived Flexibility

Perceived flexibility refers to individuals' subjective assessment or understanding of the degree to which they have the freedom, adaptability, and options to make choices or adjustments in various aspects of their lives or environments. This perception of flexibility can relate to different contexts, such as educational settings, work environments, health behaviors, and personal life boundaries.

In the context of online learning during the COVID-19 pandemic, perceived flexibility can encompass students' views on the extent to which they can manage their learning schedules, access resources, engage with course materials, and adapt to changing circumstances in a virtual learning environment [26]. It involves students' beliefs about the level of control they have over their learning process, the ability to balance academic requirements with other responsibilities, and the capacity to adjust their study routines to meet individual needs [27].

Studies have shown that perceived flexibility in online education can positively impact student satisfaction, engagement, and learning outcomes [28]. The perceived flexibility of the delivery medium, such as the availability of resources, interactive tools, and communication channels, can significantly influence students' perceptions of the learning experience and their overall satisfaction with online courses [28].

Perceived flexibility in online learning during the COVID-19 pandemic is essential for undergraduate students, as it includes their ability to manage schedules, access resources, engage with materials, and adapt to changes in a virtual environment [29]. This flexibility is linked to undergraduate students' beliefs about their control over the learning process, balancing academic and other responsibilities, and adjusting study routines to individual needs [30]. Research shows that perceived flexibility positively impacts undergraduate students' satisfaction, engagement, and learning outcomes [31]. The availability of resources, interactive tools, and communication channels greatly influences undergraduate students' learning experiences and overall satisfaction with online courses. For undergraduate students, perceiving flexibility in their online environment is crucial for managing academic responsibilities alongside other commitments, enhancing engagement, satisfaction, and academic performance.

1.3. Attitudes towards the Use of Distance Learning Environment

Students' attitudes towards the use of distance learning environments can be influenced by various factors, including the perceived flexibility of the learning platform, the quality of educational resources available, the level of interactivity and engagement offered, and the overall effectiveness of the online learning experience [30]. Positive attitudes towards distance learning may stem from the convenience, accessibility, and adaptability that online education provides, allowing for students to learn at their own pace and in a location of their choice [32]. Moreover, attitudes towards the use of distance learning environments can be shaped by students' perceptions of the support and resources available, the level of interaction with instructors and peers, and the overall satisfaction with the learning experience [33]. Positive attitudes are often associated with perceptions of efficiency, effectiveness,

and the ability of educational institutions to facilitate a seamless transition to online learning [34]. Additionally, attitudes towards the use of distance learning environments may be influenced by students' experiences with technology, their comfort level with online tools, and their motivation to engage in virtual learning activities [35]. Positive attitudes are often linked to students' perceptions of the benefits of distance learning, such as flexibility, convenience, and the opportunity to develop self-regulated learning skills [36].

Several factors that affect undergraduate students' opinions and experiences in online education determine their attitudes toward distance learning environments [37]. Important factors include the level of interactivity and engagement, the perceived flexibility of the learning platform, the quality of instructional materials, and the overall effectiveness of the online learning experience [38]. Positive attitudes often arise from the convenience, accessibility, and adaptability of online education, allowing for students to learn at their own pace and preferred location [37]. Additionally, undergraduate students' perceptions of available support and resources, interaction with instructors and peers, and overall satisfaction impact their attitudes [39]. The technological experiences, ease of utilizing online resources, and motivation of undergraduate students to participate in online learning activities are also important factors [40]. Positive attitudes are associated with perceived benefits such as flexibility, convenience, and opportunities for developing self-regulated learning skills [30]. In conclusion, undergraduate students' attitudes towards distance learning are influenced by perceived flexibility, resource quality, interaction levels, and overall satisfaction. Addressing these factors can enhance students' engagement, satisfaction, and success in online learning environments.

1.4. Context of This Study

This study was carried out at the state university in İzmir, Türkiye. Prior to the COVID-19 pandemic, an open-source learning management system and video conferencing system for faculty and undergraduate students were available but underused. Although it was used to support formal education, it was not as common as after the COVID-19 pandemic. With school closures due to COVID-19, these tools have served as the primary learning environment for undergraduate students for the past year. It should be noted that the undergraduate students who participated in the research actively used these systems for a year.

1.5. Purpose of the Study

The main purpose of this study was to analyze the relationship between undergraduate students' self-regulated online learning, perceived flexibility, and attitudes towards the use of distance learning environment. The following questions were addressed within this framework:

1. What are the levels of self-regulated online learning, perceived flexibility, and attitudes towards the use of distance learning environment of undergraduate students?
2. Is there a relationship between undergraduate students' self-regulated online learning, perceived flexibility, and attitudes towards the use of distance learning environment?
3. To what extent do perceived flexibility and attitudes towards the use of distance learning environment predict the level of self-regulated online learning among undergraduate students?

2. Materials and Methods

2.1. Research Model

To achieve the purpose of this study, this quantitative research was designed as a survey-type correlational research model. This model is used to determine how closely two or more variables are related to one another [41]. This model is crucial in determining the degree of association between two or more variables, providing insights into how closely they are related to each other. Furthermore, the survey-type correlational research model allows for researchers to analyze the strength and direction of relationships between variables

through statistical methods such as Pearson correlation coefficients [42]. This analytical approach facilitates a deeper understanding of how variables interact and influence each other, offering valuable insights for theory development and practical implications.

2.2. Data Collecting Tools

In this study, “Self-Regulated Online Learning Questionnaire”, “Scale of Flexibility in Open and Distance Learning”, and “Attitude Scale Regarding the Use of Distance Education Environments in the Pandemic Process” were utilized.

Self-Regulated Online Learning Questionnaire. Developed by Jansen and his colleagues, SOL-Q was a five-dimensional scale including metacognitive skills, help seeking, time management, persistence, and environmental structuring dimensions and consisted of 36 five-point Likert-type items. The original scale was adapted by Yavuzalp and Ozdemir [43]. Exploratory factor analysis (EFA) was performed to test the construct validity of the items in the Turkish version. According to the EFA results, the adapted scale comprised five dimensions and 36 items as in the original scale, explaining 62.06% of the total variance. As mentioned in a previous study [43], Cronbach’s alpha reliability coefficient of the five-factor structure was calculated as 0.963 and reliability coefficients of the sub-dimensions vary between 0.701 and 0.956, which indicated that the adapted scale was sufficiently reliable. Then, as for the validity study of the scale, confirmatory factor analysis was conducted. Fit indices were calculated as RMSEA = 0.071, SRMR = 0.051, NFI = 0.98, NNFI = 0.98, CFI = 0.99, GFI = 0.82, and AGFI = 0.79. According to results, it can be stated that while the values of χ^2/df (4.21), SRMR, and RMSEA are within the acceptable limits, NFI, NNFI, and CFI values are in good fit [44].

Scale of Flexibility in Open and Distance Learning. Developed by Bergamin, Ziska, and Groner [45], the scale of flexibility in open and distance learning consisted of 13 five-point Likert-type items explaining 49% of the total variance with three-factor structure. The sub-dimensions of the original scale were flexibility of time management, flexibility of teacher contact, and flexibility of content. The scale was revised by Bergamin Ziska, Werlen, and Siegenthaler [46], including nine items within the same three factors that emerged in the original scale. This revised scale was then adapted to Turkish and validity–reliability analyses were conducted by Kokoç [47]. The adaptation study of the scale was applied on two separate samples of distance learners in Turkey. EFA was used to examine the factorial structure of the scale patterns for the Turkey sample. According to the results of the EFA, the three-dimensional scale consisted of nine items explaining 56.46% of the total variance. The Cronbach’s alpha reliability coefficient of the three-factor structure was determined as 0.88–0.85 for the “flexibility of time management” dimension, 0.72 for the “flexibility of teacher contact” dimension, and 0.73 for the “flexibility of content” dimension. Total item correlations of the scale were calculated between (0.44) and (0.69), which were within acceptable values. Within the scope of this study, first-order CFA and second-order CFA were performed, and both confirmed the validity of the adapted scale. CFA results showed that a three-factor intercorrelated model of perceived flexibility provided the best fit for the data. Model data fit index values were calculated as $\chi^2/sd = 1.26$, RMSEA = 0.04, NFI = 0.96, and CFI = 0.99. According to the results obtained, it can be stated that the value obtained corresponds to superior fit as the χ^2/df value (1.26) is below 2 [48].

According to research methodologies, a variation explained of less than 60% could be considered insufficient when aiming for deeper clarification. A greater proportion of explained variance indicates that the variables or model used for the analysis are more effective at capturing the fundamental relationships seen in the data [49]. However, because multivariate data structures are complicated, it is frequently accepted in social science research for the explained variance to be less than 60% [50,51]. In the social sciences, a variety of factors impact human behavior, which results in a smaller explained variance. It is clarified that in social science research, variances between 50 and 60 percent are typically accepted [50]. Furthermore, all of the measures utilized in this study had reliability coefficients (Cronbach’s alpha) above 0.70, demonstrating the scales’ reliability and con-

sistency [51]. The “Scale of Flexibility in Open and Distance Learning” is designed to aid educators and instructional designers in developing strategies to enhance students’ self-regulated learning skills in self-paced open and distance learning environments [52]. This scale contributes to understanding the relationship between flexible and self-regulated learning in open and distance universities [46].

Attitude Scale Regarding the Use of Distance Education Environments in the Pandemic Process. The attitude scale regarding the use of distance education environments in the pandemic process, developed by Yıldız, Çengel, and Alkan [53], was presented to 4 field experts, one from the assessment and evaluation field, one from the Turkish language field, and one from the psychological counseling and guidance field in terms of content validity. EFA was used to develop the scale. According to the results of the EFA, this 5-point Likert scale consisted of 24 items explaining 73.42% of the total variance with a four-factor structure. The Cronbach’s alpha reliability coefficient of the four-factor structure was determined as 0.93–0.94 for the “competence and motivation” dimension, 0.81 for the “usability” dimension, 0.88 for the “effectiveness” dimension, and 0.84 for the “satisfaction” dimension. Within the scope of this study, CFA was applied to confirm the 4-dimensional structure of the scale. As mentioned in a previous study [53], CFA fit indices (RMSEA, GFI, AGFI, CFI, and TLI) of all dimensions were calculated within the acceptable limits.

An essential aspect of employing the survey-type correlational research model is evaluating the reliability and validity of the research instruments used. For example, researchers commonly use Cronbach’s alpha reliability coefficient to assess the internal consistency of scales or questionnaires [54]. High Cronbach’s alpha values indicate strong reliability, ensuring that the items in the instrument consistently measure the intended constructs [54]. The Cronbach’s alpha values for the constructs investigated in this study are as follows: The self-regulated online learning questionnaire has an overall reliability coefficient of 0.963, with sub-dimension reliabilities ranging from 0.701 to 0.956. The scale of flexibility in open and distance learning shows an overall reliability coefficient of 0.88, with sub-dimension reliabilities between 0.72 and 0.85. The attitude scale regarding the use of distance education environments in the pandemic process has an overall reliability coefficient of 0.93, with sub-dimension reliabilities ranging from 0.81 to 0.94. These values indicate that the scales used in our study are reliable and provide consistent measurements of the constructs investigated. In the original study by [43], the Cronbach’s alpha reliability coefficient for the self-regulated online learning questionnaire was 0.963, while in this study, it was 0.832, which indicates acceptable reliability. For the scale of flexibility in open and distance learning, a reliability coefficient of 0.880 was reported, and our study found it to be 0.819, which is also within acceptable reliability [46]. The attitude scale regarding the use of distance education environments in the pandemic process originally had a reliability coefficient of 0.930, and our study calculated it as 0.923, demonstrating high reliability comparable to the original [53]. These values confirm that the data collection tools used in this study maintained a high level of internal consistency, ensuring the validity and reliability of findings.

2.3. Sampling

Participants of this study were selected by simple random sampling method. The sample size was calculated using the Cochran equation ($n = z^2pq/e^2$). Using the Raosoft program available on the internet [55], the sample size was calculated using a margin of error of 5%, an estimated response distribution of 75%, and a 95% confidence level. A minimum of 274 participants was determined to be required for the sample. The decision was made to distribute the survey to 366 participants. A total of 305 students (216 female; 89 male) studying at the state university in İzmir, Türkiye constituted the sample of the study. The participant group consists of 70.8% of the female and 29.2% of the male. The average age of the participants is 20.86. After performing the outlier analyses, 5 participants were excluded from this study and 300 participants were included in this study (Table 1).

Table 1. Descriptive statistics of the participants.

			Gender	
			Female	Male
Grade Level	1	N %	41 77.4%	12 22.6%
	2	N %	67 74.4%	23 25.6%
	3	N %	81 65.3%	43 34.7%
	4	N %	22 66.7%	11 33.3%
	Total	N %	211 70.3%	89 29.7%

2.4. Data Analysis

SPSS 25.0 was used to analyze the data, and $p < 0.05$ was considered statistically significant. The descriptive statistics used for the data were frequencies, percentage, arithmetic mean, and standard deviation. Mahalanobis distance, Cook's and Leverage values, Durbin Watson residuals, tolerance, and VIF values were calculated as prerequisites for multiple regression analysis. In addition, correlation and regression test were used for further analysis. Pearson correlation analysis was used to determine the relationship between self-regulated online learning, perceived flexibility, and attitudes towards the use of distance learning environment of undergraduate students. Multiple regression analysis was used to determine to what extent perceived flexibility and attitudes towards the use of distance learning environment predict undergraduate students' self-regulated online learning. In this study, "perceived flexibility" and "attitudes towards the use of distance learning environment" were the independent variables while "self-regulated online learning" was the dependent variable.

3. Results

Descriptive statistics were calculated to the level of self-regulated online learning, perceived flexibility, and attitudes towards the use of distance learning environment of undergraduate students, and the results are shown in Table 2.

Table 2 presents descriptive statistics for the self-regulated online learning, perceived flexibility, and attitudes towards the use of distance learning environments among undergraduate students. The results indicate a moderate to high level of self-regulation with a mean score of 173.84 (SD = 34.08). Students perceive moderate flexibility in their learning environments (mean = 36.62, SD = 5.20). Attitudes towards the use of distance learning environments are generally positive (mean = 77.27, SD = 17.09). Overall, students exhibit good self-regulation, perceive moderate flexibility, and hold positive attitudes towards the use of distance learning environments.

It includes detailed information on the high and low-scoring items for each scale to provide better insight into the students' perspectives.

"The Scale of Flexibility in Open and Distance Learning" includes the three highest and three lowest scoring items as follows: The highest scoring items are Item 9 (4.46)—"I can learn subjects that I am particularly interested in on my own"; Item 3 (4.41)—"I can repeat course topics whenever I want"; and Item 1 (4.28)—"I can decide when I want to learn". The lowest scoring items are Item 5 (3.84)—"There are different ways to contact faculty members"; Item 6 (3.79)—"I also have something to say about the course topic"; and Item 4 (3.45)—"I can contact faculty members whenever I want".

"The Attitude Scale Regarding the Use of Distance Education Environments in the Pandemic Process" includes the three highest and three lowest scoring items as follows:

The highest scoring items are Item 7 (4.12)—“*I think this platform is easy to use*”; Item 23 (3.98)—“*I am satisfied with the design of the online courses conducted through the platform*”; and Item 17 (3.88)—“*I think that the distance education provided by the platform is more effective on the learning process than traditional face-to-face education*”. The lowest scoring items are Item 16 (2.21)—“*I can effectively benefit from the offline studies offered by the platform throughout the learning-teaching process*”; Item 9 (2.01)—“*I found this platform unnecessarily complex*”; and Item 12 (1.87)—“*I think I may need the support of a technical person to use this platform*”.

Table 2. The level of self-regulated online learning, perceived flexibility, and attitudes towards the use of distance learning environment of undergraduate students.

Scale	Factor	N	Minimum	Maximum	Mean	SD	Item Average
Self-regulated online learning		300	78.00	252.00	173.84	34.08	4.83
	Metacognitive skills	300	19.00	126.00	83.60	20.68	4.64
	Time management	300	6.00	21.00	13.23	3.62	4.41
	Environmental structuring	300	10.00	35.00	27.79	6.12	5.56
	Persistence	300	5.00	35.00	24.61	6.64	4.92
	Help seeking	300	5.00	35.00	24.61	6.89	4.92
Perceived flexibility		300	21.00	45.00	36.62	5.20	4.07
	Flexibility of time management	300	7.00	15.00	12.72	1.93	4.24
	Flexibility of teacher contact	300	2.00	10.00	7.29	2.11	3.65
	Flexibility of content	300	9.00	20.00	16.61	2.50	4.15
Attitudes towards the use of distance learning environment		300	37.00	120.00	77.27	17.09	3.22
	Competence and motivation	300	7.00	35.00	20.64	7.47	2.95
	Usability	300	10.00	40.00	24.51	4.41	3.06
	Effectiveness	300	6.00	25.00	17.08	4.15	3.41
	Satisfaction	300	5.00	20.00	15.05	3.54	3.76

“The Self-Regulated Online Learning Questionnaire” includes the three highest and three lowest scoring items as follows: The highest scoring items are Item 24 (5.80)—“*I know where to study most efficiently when taking an online course*”; Item 23 (5.67)—“*I find a comfortable place to study for the online course*”; and Item 25 (5.54)—“*I have a specific location set up for online class*”. The lowest scoring items are Item 34 (3.94)—“*I insist on getting help from the teacher of the online course*”; Item 19 (3.87)—“*I find it difficult to stick to a study schedule for online class*”; and Item 21 (3.82)—“*I usually can’t spare much time for online class due to other activities*”.

Table 3 displays the correlations between self-regulated online learning, perceived flexibility, and attitudes towards the use of distance learning environments. The Pearson correlation coefficients reveal significant positive relationships among all variables at the 0.01 level. Specifically, self-regulated online learning is moderately correlated with perceived flexibility ($r = 0.505, p < 0.01$) and strongly correlated with attitudes towards distance learning ($r = 0.579, p < 0.01$). Additionally, there is a moderate correlation between perceived flexibility and attitudes towards distance learning ($r = 0.474, p < 0.01$). These findings suggest that higher levels of self-regulation in online learning are associated with greater perceived flexibility and more positive attitudes towards distance learning environments.

A model summary of the multiple regression analysis can be found on Table 4. Multiple regression analysis was used to determine to what extent perceived flexibility and attitudes towards the use of distance learning environment predict undergraduate students’ self-regulated online learning. Table 4 presents the model summary of a regression analysis examining the relationship between perceived flexibility, attitudes towards the use of distance learning environments, and their impact on the dependent variable as

self-regulated online learning. The model shows a moderate to strong fit, with an R value of 0.635, indicating that approximately 40.4% of the variance in the dependent variable is explained by the predictors. The adjusted R² value of 0.400 suggests that the model's explanatory power remains robust even when accounting for the number of predictors. The F-test result ($F = 100.546$, $p < 0.001$) indicates that the overall model is statistically significant in predicting the dependent variable. Predictors in the model include attitudes towards the use of distance learning environments, and perceived flexibility, both of which are significant predictors ($p < 0.001$). These findings suggest that attitudes towards the use of distance learning environments, and perceived flexibility play important roles in predicting self-regulated online learning.

Table 3. Correlation between self-regulated online learning, perceived flexibility, and attitudes towards the use of distance learning environment.

		Self-Regulated Online Learning	Perceived Flexibility	Attitudes
Pearson correlation	Self-regulated online learning	-		
	Perceived flexibility	0.505 **	-	
	Attitudes	0.579 **	0.474 **	-
Sig. (2-tailed)	Self-regulated online learning	-		
	Perceived flexibility	0.000 **	-	
	Attitudes	0.000 **	0.000 **	-
N	Self-regulated online learning	-		
	Perceived flexibility	300	-	
	Attitudes	300	300	-

** Correlation is significant at the 0.01 level (2-tailed).

Table 4. Model summary of regression analysis.

R	R ²	Adjusted R ²	S.E.	Change Statistics				
				R ² Change	F Change	df1	df2	p
0.635a	0.404	0.400	26.40504	0.404	100.546	2	297	0.000

Table 5 summarizes the results of a standard multiple regression analysis predicting self-regulated online learning from perceived flexibility and attitudes towards the use of distance learning environments. Both predictors are statistically significant, with perceived flexibility ($B = 1.955$, $\beta = 0.298$, $p < 0.001$) and attitudes towards the use of distance learning environments ($B = 0.872$, $\beta = 0.437$, $p < 0.001$) contributing significantly to the model. The regression model is moderately strong, with an R value of 0.633, indicating that about 40.1% of the variance in self-regulated online learning is explained by the two predictors. The F value of 99.333 ($p < 0.001$) confirms the overall statistical significance of the model. These results suggest that both perceived flexibility and positive attitudes towards distance learning significantly enhance students' self-regulated online learning abilities.

In addition, according to the beta coefficients and p-values, attitudes towards the use of distance learning environments explained more variance than perceived flexibility and both dimensions contributed to self-regulated online learning significantly (attitudes towards the use of distance learning environments: $\beta = 0.437$, $t = 8.597$, $p < 0.001$; perceived flexibility: $\beta = 0.298$, $t = 5.858$, $p < 0.001$). According to the results of the regression analysis performed separately to reveal the effect of each variable on the dependent variable, the attitudes

towards the use of distance learning environments variable accounts for 33.5% of self-regulated online learning ($R^2 = 0.335$, $F = 150.000$, $p < 0.001$), while the perceived flexibility variable accounts for 25.5% of self-regulated online learning ($R^2 = 0.255$, $F = 102.193$, $p < 0.001$). These findings indicate that attitudes towards the use of distance learning environments carries a greater weight and has a stronger impact on students' self-regulated online learning behaviors than perceived flexibility.

Table 5. Standard multiple regression analysis results for predicting self-regulated online learning.

Variable	B	S.E.	β	t	p<
(Constant)	34.868	11.059		3.153	0.002
Perceived flexibility	1.955	0.334	0.298	5.858	0.000
Attitudes	0.872	0.101	0.437	8.597	0.000

$R = 0.633$; $R^2 = 0.401$; F value = 99.333; $p < 0.001$.

4. Discussion

This study explores the relationship between undergraduate students' self-regulated online learning, perceived flexibility, and attitudes towards the use of distance learning environments. This study's findings emphasize the importance of self-regulated online learning and perceived flexibility in shaping students' attitudes towards the use of distance learning environments. Understanding how students regulate their learning processes and perceive the flexibility of online education can offer valuable insights for educators and institutions seeking to enhance the online learning experience. By promoting self-regulated learning behaviors and providing flexible learning environments, educational institutions can potentially enhance student engagement, satisfaction, and academic outcomes in online settings [23,31].

The research in [56] focusses on evaluating students' attitudes towards online learning, which is relevant for understanding student perceptions of distance learning. Similarly, the positive impact of self-regulation on student engagement in online learning environments aligns with the findings of good self-regulation among students in this study [57]. Moreover, it is emphasized that learning motivation has a role in shaping students' attitudes towards technology-based self-directed learning, which could be associated with the positive attitudes observed towards distance learning in this study [58]. Additionally, self-regulated learning strategies during the COVID-19 pandemic offer insights into how students adjust their learning approaches in online settings, potentially influencing their perceived flexibility and attitudes towards the use of distance learning environments [59].

The importance of fostering students' self-regulated learning behaviors in online settings has been underscored, which supports the positive correlation identified between self-regulated online learning and attitudes towards the use of distance learning environments in this study [20]. In addition, another study [60] emphasized the ongoing self-regulation as essential for successful learning in online environments, further endorsing the idea that self-regulated online learning is positively associated with perceived flexibility and attitudes towards the use of distance learning environments.

The findings of this study are consistent with the existing literature. For example, it is highlighted that there are significant effects of flexible online courses on students' satisfaction, supporting the positive relationship between perceived flexibility and self-regulated online learning [32]. It is found that self-efficacy and interaction positively predict student satisfaction and perceived learning in online distance learning, which aligns with the importance of attitudes towards the use of distance learning environments in predicting self-regulated online learning [61].

The findings of this study indicate a moderate to high level of self-regulation among undergraduate students. This result is supported by the existing literature, which highlights that self-regulation strategies significantly impact online learning success [62]. Similarly, high levels of self-regulation among undergraduate students who use diverse learning

strategies have been documented [63]. However, some studies present opposing views. For instance, while some students exhibit high self-regulation, many struggle to maintain consistent self-regulation in online learning environments [64]. Additionally, undergraduate students often lack sufficient self-regulation skills and require additional training to improve their learning outcomes [65].

In another study, undergraduate students perceive moderate flexibility in their learning environments, align with findings that emphasize the benefits and positive perceptions of flexible learning environments [66]. However, there is also evidence that perceived flexibility varies. Some students perceive their learning environments as rigid [67], and not all students perceive their learning environments as flexible, indicating a need for better design and implementation [68].

In this study, undergraduate students had generally positive attitudes towards the use of distance learning environments, which is corroborated by studies that found students' positive attitudes towards e-learning correlate with high satisfaction and perceived learning [69,70]. Nonetheless, there are mixed attitudes reported in the literature. While some undergraduate students have positive attitudes, others express concerns about the lack of face-to-face interaction and the challenges of self-regulation in e-learning [71]. Similarly, technical difficulties and a lack of interaction with instructors can negatively impact undergraduate students' attitudes towards the use of distance learning environments [72].

The findings of this study indicate that self-regulated online learning is moderately correlated with perceived flexibility and strongly correlated with attitudes towards the use of distance learning environments. These results are supported by the existing literature. For example, it is highlighted that self-regulation significantly impacts undergraduate students' perceived flexibility and satisfaction with online courses [62]. Similarly, undergraduate students with higher self-regulation skills tend to have more positive attitudes towards online learning environments [73]. However, some studies present opposing views. It is noted that while self-regulation is important, it does not always translate to perceived flexibility or positive attitudes due to other influencing factors such as course design and instructor support [64].

The moderate correlation between perceived flexibility and attitudes towards the use of distance learning environments aligns with findings that flexible learning environments are generally perceived positively by students and contribute to their overall satisfaction with distance learning [66]. However, there is evidence suggesting variability in this relationship. For instance, while perceived flexibility is beneficial, it does not universally lead to positive attitudes, particularly when students face technical difficulties or lack interaction with peers and instructors [71].

Moreover, the relationship between self-regulation and self-efficacy, suggesting their interdependence, is emphasized, which could further support the significant contribution of perceived flexibility and attitudes towards the use of distance learning environments to self-regulated online learning [74].

5. Conclusions

The literature cited in the Section 4 supports this study's findings and provides additional insights relevant to several Sustainable Development Goals (SDGs). For instance, fostering self-regulated learning behaviors in online settings aligns with SDG 4, which emphasizes inclusive and equitable quality education. Studies highlight the positive correlation between self-regulated online learning and attitudes toward distance learning, indicating that promoting self-regulation can enhance the quality and accessibility of education. The role of learning motivation in shaping students' attitudes towards technology-based self-directed learning supports the positive attitudes observed towards distance learning in this study, further contributing to lifelong learning opportunities as envisioned by SDG 4.

Additionally, the literature emphasizes the significant effects of flexible online courses on students' satisfaction, supporting the positive relationship between perceived flexibility and self-regulated online learning. This aligns with SDG 10, which aims to reduce inequali-

ties by making quality education more accessible to diverse student populations through flexible learning options. The positive effects of perceived flexibility on student satisfaction and self-regulated learning underscore the importance of creating adaptable and inclusive learning environments that cater to a wide range of educational needs.

Moreover, the significant contribution of self-efficacy and interaction to student satisfaction and perceived learning in online distance education highlights the need for collaborative efforts to improve educational practices, resonating with SDG 17. By promoting partnerships among educational institutions, technology providers, and policymakers, effective interventions can be developed to enhance self-regulated learning and perceived flexibility.

To fully leverage the advantages of online education and advance SDG 4, educational institutions should establish comprehensive digital literacy programs. These initiatives should empower students with the skills needed to effectively navigate and use online learning platforms, thereby enhancing their self-regulated learning abilities. By promoting digital fluency, students can better control their learning processes, resulting in improved educational outcomes. In line with SDG 10, there should be a focus on creating and developing inclusive learning technologies that address the diverse needs and backgrounds of students. Collaboration between educational institutions and technology providers is crucial to develop adaptive learning tools that provide personalized learning experiences, ensuring equal access to quality education for all students, irrespective of their socioeconomic status or learning capabilities. Supporting SDG 17, it is vital to strengthen institutional support systems through partnerships among educational institutions, mental health services, and community organizations. Offering comprehensive support services such as counseling, academic advising, and peer mentoring can boost students' self-efficacy and engagement in online learning. These partnerships can ensure that students receive well-rounded support, fostering a more supportive learning environment that encourages self-regulated learning and overall well-being.

Educational institutions should develop and implement programs aimed at enhancing students' self-regulated learning behaviors, as higher self-regulation skills are associated with more positive attitudes towards online learning environments [1,5]. The strong correlation between self-regulated online learning and positive attitudes towards distance learning environments found in this study highlights the importance of fostering such attitudes to enhance self-regulation among undergraduate students. Providing flexible learning environments is crucial for increasing student satisfaction and perceived learning, as flexible online courses significantly impact student engagement and satisfaction [32,66]. The significant role of perceived flexibility in contributing to self-regulation found in this study supports the need for institutions to offer flexible learning options to students. Many students struggle with self-regulation in online learning environments [64]; hence, institutions should offer additional training and support to improve these skills, such as time management workshops and personalized coaching [65]. This study's findings that self-regulated online learning is moderately correlated with perceived flexibility suggest that such training can be particularly effective in enhancing undergraduate students' ability to manage their learning processes in flexible environments. Course design and instructor support are critical in shaping students' attitudes towards online learning [3,7]; thus, institutions should focus on engaging course designs and ensuring instructor accessibility [68]. The positive correlation between attitudes towards distance learning environments and self-regulated online learning found in this study underscores the importance of well-designed courses and accessible instructors in fostering positive attitudes and enhancing self-regulation. Addressing technical challenges by investing in reliable, user-friendly online platforms and providing technical support can maintain a positive attitude towards online learning [71]. The findings that positive attitudes towards distance learning environments are associated with higher levels of self-regulation indicate that minimizing technical issues can help maintain these positive attitudes and support self-regulated online learning. Promoting positive attitudes towards distance learning through marketing campaigns and educational programs that highlight its benefits can enhance student satisfaction and

perceived learning [69]. Given this study's findings on the importance of positive attitudes in enhancing self-regulation, such promotional efforts can be instrumental in improving overall undergraduate student engagement and success in online learning environments.

This study has some limitations. Firstly, sample size is statistically adequate but limited to one geographical area. Future studies could incorporate a more diverse geographic sample to increase the generalizability of the findings. Secondly, the cross-sectional design of our study limits our ability to draw causal inferences. Longitudinal studies could be conducted to observe changes over time in self-regulated online learning, perceived flexibility and attitudes towards the use of distance learning environments. Longitudinal studies have the potential to offer valuable insights into the dynamics of online learning experiences over time, allowing for a more nuanced understanding of the factors influencing learning outcomes [75].

Future research should explore specific interventions aimed at promoting self-regulated learning and investigate the role of technology in supporting these processes, providing valuable insights into optimizing online learning environments. Understanding how different pedagogical approaches and technological tools influence students' self-regulation and perceptions of flexibility can significantly contribute to the ongoing improvement of online education practices, ultimately supporting the broader goals of sustainable development. Future studies could examine the impact of various demographic factors, such as age, gender, and socioeconomic status, on self-regulated online learning, perceived flexibility, and attitudes towards the use of distance learning environments. Moreover, investigating the long-term effects of self-regulated online learning strategies and the sustainability of flexible learning environments would also provide valuable insights for educators and policymakers.

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References

1. Jansen, R.S.; van Leeuwen, A.; Janssen, J.; Conijn, R.; Kester, L. Supporting learners' self-regulated learning in Massive Open Online Courses. *Comput. Educ.* **2020**, *146*, 103771. [CrossRef]
2. Murdoch, K.; Wilson, J. Student Independent Learning. *Education Quarterly*. 2006.
3. Meyer, B.; Haywood, N.; Sachdev, D.; Faraday, S. What Is Independent Learning and What Are the Benefits for Students? Department for Children, Schools and Families Research Report 051. 2008. Available online: <http://www.curee.co.uk/files/publication/1301587364/independentlearning.doc> (accessed on 5 June 2024).
4. Price, D.W.; Carliner, S.; Chen, Y. Independent learning. In *Instructional Design Standards for Distance Learning*; Routledge: Oxford, UK, 2017; p. 94.
5. Harris, B.R.; Piña, A.A. Incorporating self-regulated learning strategies in online courses. In *Real-Life Distance Education: Case Studies in Practice*, 2nd ed.; Piña, A.A., Mizell, A.P., Eds.; Information Age Publishing: Charlotte, NC, USA, 2014; pp. 3–20.
6. Hooshyar, D.; Pedaste, M.; Saks, K.; Leijen, Ä.; Bardone, E.; Wang, M. Open learner models in supporting self-regulated learning in higher education: A systematic literature review. *Comput. Educ.* **2020**, *154*, 103878. [CrossRef]
7. Schunk, D.H.; Zimmerman, B.J. (Eds.) *Motivation and Self-Regulated Learning: Theory, Research, and Applications*; Routledge: Oxford, UK, 2012.
8. Phye, G.D. Learning. In *Encyclopedia of Applied Psychology*; Anderson, J.R., Ed.; Elsevier: Oxford, UK, 2004; Volume 2, pp. 519–526.
9. López-Pérez, M.V.; Pérez-López, M.C.; Rodríguez-Ariza, L. Blended learning in higher education: Students' perceptions and their relation to outcomes. *Comput. Educ.* **2011**, *56*, 818–826. [CrossRef]
10. Fields, L.; Perkiss, S.; Dean, B.A.; Moroney, T. Nursing and the sustainable development goals: A scoping review. *J. Nurs. Scholarsh.* **2021**, *53*, 568–577. [CrossRef]

11. Domina, T.; Renzulli, L.; Murray, B.; Garza, A.N.; Perez, L. Remote or removed: Predicting successful engagement with online learning during COVID-19. *Socius* **2021**, *7*, 237802312098820. [\[CrossRef\]](#)
12. Demir, A.; Maroof, L.; Khan, N.; Ali, B. The role of e-service quality in shaping online meeting platforms: A case study from higher education sector. *J. Appl. Res. High. Educ.* **2020**, *13*, 1436–1463. [\[CrossRef\]](#)
13. Walsh, C.; Mital, A.; Ratcliff, M.; Yap, A.; Jamaledine, Z. A public-private partnership to transform online education through high levels of academic student support. *Australas. J. Educ. Technol.* **2020**, *36*, 30–45. [\[CrossRef\]](#)
14. Nguyen, V.T.T.; Chen, H.L. Examining impacts of information system success and perceived stress on students' self-regulated learning mediated by intrinsic motivation in online learning environments: Second-order structural equation modelling analyses. *Educ. Inf. Technol.* **2023**, *28*, 12945–12968. [\[CrossRef\]](#)
15. Santoso, H.B.; Riyanti, R.D.; Prastati, T.; Susanty, A.; Yang, M. Learners' online self-regulated learning skills in Indonesia Open University: Implications for policies and practice. *Educ. Sci.* **2022**, *12*, 469. [\[CrossRef\]](#)
16. Miao, J.; Ma, L. Students' online interaction, self-regulation, and learning engagement in higher education: The importance of social presence to online learning. *Front. Psychol.* **2022**, *13*, 815220. [\[CrossRef\]](#) [\[PubMed\]](#)
17. Stan, M.M.; Topală, I.R.; Necșoi, D.V.; Cazan, A.M. Predictors of learning engagement in the context of online learning during the COVID-19 pandemic. *Front. Psychol.* **2022**, *13*, 867122. [\[CrossRef\]](#) [\[PubMed\]](#)
18. Tülübaş, T. Çevrim içi öğrenmede öz-düzenleme becerisinin akademik başarıya etkisi. *Anadolu J. Educ. Sci. Int.* **2022**, *12*, 389–416. [\[CrossRef\]](#)
19. Prasetya, R.E. The interplay between self-regulated learning behavioral factors and students' performance in English language learning through Moodle. *ELT Forum J. Engl. Lang. Teach.* **2023**, *12*, 145–156. [\[CrossRef\]](#)
20. Wang, C.; Shannon, D.; Ross, M. Students' characteristics, self-regulated learning, technology self-efficacy, and course outcomes in online learning. *Distance Educ.* **2013**, *34*, 302–323. [\[CrossRef\]](#)
21. Kebble, P. Assessing online asynchronous communication strategies designed to enhance large student cohort engagement and foster a community of learning. *J. Educ. Train. Stud.* **2017**, *5*, 92. [\[CrossRef\]](#)
22. Zheng, Y.; He, L. Effects of personal learning space on learners' online self-regulated learning capability and collaborative learning level. In Proceedings of the 2014 International Conference on Education and Information Technology, San Francisco, CA, USA, 22–24 October 2014; p. 18. [\[CrossRef\]](#)
23. Li, L.; Zhang, J. Successful online learning experience: Perceptions of Chinese undergraduate students. *J. Educ. Learn.* **2021**, *10*, 74. [\[CrossRef\]](#)
24. Chusak, C.; Tangmongkhonsuk, M.; Sudjapokinon, J. The association between online learning and food consumption and lifestyle behaviors and quality of life in terms of mental health of undergraduate students during COVID-19 restrictions. *Nutrients* **2022**, *14*, 890. [\[CrossRef\]](#) [\[PubMed\]](#)
25. Chao, Q.; He, H.; Zhu, J.; Hu, J.; Yu, J. Do learners with higher readiness feel less anxious when studying online at home? *Front. Psychol.* **2022**, *13*, 945914. [\[CrossRef\]](#)
26. Dost, S.; Hossain, A.; Shehab, M.; Abdelwahed, A.; Al-Nusair, L. Perceptions of medical students towards online teaching during the COVID-19 pandemic: A national cross-sectional survey of 2721 UK medical students. *BMJ Open* **2020**, *10*, e042378. [\[CrossRef\]](#)
27. Shrestha, B.; Subedi, S.; Koirala, U.; Manandhar, P.; Baral, P. Perception of equivalence of online classes to face to face classes among dental and medical undergraduate students of Gandaki Medical College, Nepal. *J. Chitwan Med. Coll.* **2021**, *11*, 56–60. [\[CrossRef\]](#)
28. Arbaugh, J.; Duray, R. Technological and structural characteristics, student learning and satisfaction with web-based courses. *Manag. Learn.* **2002**, *33*, 331–347. [\[CrossRef\]](#)
29. Chandradasa, A.; Galhena, B. Undergraduates' satisfaction with Zoom e-learning application: Empirical evidence from management undergraduates. *South Asian J. Bus. Insights* **2022**, *2*, 26–45. [\[CrossRef\]](#)
30. Marks, R.B.; Sibley, S.D.; Arbaugh, J.B. A structural equation model of predictors for effective online learning. *J. Manag. Educ.* **2005**, *29*, 531–563. [\[CrossRef\]](#)
31. Zhou, X.; Chai, C.; Jong, M.; Xiong, X. Does relatedness matter for online self-regulated learning to promote perceived learning gains and satisfaction? *Asia-Pac. Educ. Res.* **2021**, *30*, 205–215. [\[CrossRef\]](#)
32. Turan, Z.; Küçük, S.; Karabey, S. The university students' self-regulated effort, flexibility and satisfaction in distance education. *Int. J. Educ. Technol. High. Educ.* **2022**, *19*, 3. [\[CrossRef\]](#) [\[PubMed\]](#)
33. Antoniadis, K.; Zafiroopoulos, K.; Mitsiou, D. Measuring distance learning system adoption in a Greek university during the pandemic using the UTAUT model, trust in government, perceived university efficiency and coronavirus fear. *Educ. Sci.* **2022**, *12*, 625. [\[CrossRef\]](#)
34. Aydın, E.; Erol, S. The views of Turkish language teachers on distance education and digital literacy during COVID-19 pandemic. *Int. J. Educ. Lit. Stud.* **2021**, *9*, 60. [\[CrossRef\]](#)
35. Sarier, Y.; Uysal, Ş. Emergency remote teaching during COVID-19 pandemic: Challenges, opportunities and future suggestions. *Turk. Online J. Distance Educ.* **2022**, *23*, 183–195. [\[CrossRef\]](#)
36. Starr-Glass, D. Encouraging engagement: Video-conference augmentation of online distance learning environments. *Horiz. Int. J. Learn. Futures* **2020**, *28*, 125–132. [\[CrossRef\]](#)
37. Lee, Y.; Davis, R.O.; Wan, L. International students' satisfaction with online learning during the COVID-19 at a South Korean university. *Int. J. Learn. Teach. Educ. Res.* **2023**, *22*, 19–32. [\[CrossRef\]](#)

38. Shrivastava, S. Transforming medical training through online case-based learning: Brief review. *J. Pharm. Bioallied Sci.* **2024**, *16* (Suppl. S2), S1101–S1103. [CrossRef] [PubMed]
39. Blau, G.; Drennan, R. Exploring differences in business undergraduate perceptions by preferred classroom delivery mode. *Online Learn.* **2017**, *21*, 222–234. [CrossRef]
40. Aziz, S.; Mohd, R.; Selamat, M.; Omar, N. Is online training program effective for undergraduates' learning during COVID-19? A quasi-experimental study using the Malaysian sample. *Int. J. Acad. Res. Prog. Educ. Dev.* **2021**, *10*, 201–219. [CrossRef]
41. Newby, P. *Research Methods for Education*, 2nd ed.; Routledge: Oxon, UK, 2014.
42. Yusoff, D.M.; Kueh, Y.C.; Ismail, H.; Naing, N.N. Validation of Malay version of incontinence praying ability among childbearing women who attended Hospital Universiti Sains Malaysia. *Educ. Med. J.* **2017**, *9*, 69–79. [CrossRef]
43. Yavuzalp, N.; Özdemir, Y. Adaptation of the Self-Regulated Online Learning Questionnaire (SOL-Q). *J. High. Educ.* **2020**, *10*, 269–278. [CrossRef]
44. Sümer, N. Structural equation models. *Turk. Psychol. Artic.* **2000**, *3*, 49–74.
45. Bergamin, P.; Ziska, S.; Groner, R. Structural equation modeling of factors affecting success in student's performance in ODL-programs: Extending quality management concepts. *Open Praxis* **2009**, *4*, 1–8.
46. Bergamin, P.B.; Ziska, S.; Werlen, E.; Siegenthaler, E. The relationship between flexible and self-regulated learning in open and distance universities. *Int. Rev. Res. Open Distrib. Learn.* **2012**, *13*, 101–123. [CrossRef]
47. Kokoç, M. Adaptation Study of the Scale of Flexibility in Open and Distance Learning. *Educ. Technol. Theory Pract.* **2020**, *10*, 366–385.
48. Kline, R.B. *Principles and Practice of Structural Equation Modeling*, 2nd ed.; The Guilford Press: New York, NY, USA, 2005.
49. Nasvytienė, D.; Lazdauskas, T. Temperament and academic achievement in children: A meta-analysis. *Eur. J. Investig. Health Psychol. Educ.* **2021**, *11*, 736–757. [CrossRef] [PubMed]
50. Hair, J.F.; Black, W.C.; Babin, B.J.; Anderson, R.E. *Multivariate Data Analysis*, 7th ed.; Pearson: London, UK, 2010.
51. Nunnally, J.C.; Bernstein, I.H. *Psychometric Theory*, 3rd ed.; McGraw-Hill: New York, NY, USA, 1994.
52. Kocdar, S.; Karadeniz, A.; Bozkurt, A.; Büyük, K. Measuring self-regulation in self-paced open and distance learning environments. *Int. Rev. Res. Open Distrib. Learn.* **2018**, *19*, 25–43. [CrossRef]
53. Yıldız, E.P.; Çengel, M.; Alkan, A. Attitude scale regarding the use of distance education environments during the pandemic process. *OPUS Int. J. Soc. Res.* **2021**, *17*, 132–153.
54. Rojas-Chaves, M.; Matheu, M.L.; Castro-Luna, G.; Carreño, T.P.; Nievas-Soriano, B.J. Validation of a scale on society's attitudes towards the sexuality of women with intellectual disabilities—Survey study. *Int. J. Environ. Res. Public Health* **2022**, *19*, 13228. [CrossRef] [PubMed]
55. Raosoft. Sample Size Calculator. Available online: <http://www.raosoft.com/samplesize.html> (accessed on 10 July 2024).
56. Muflih, S.; Abuhammad, S.; Alzoubi, K.; Muflih, M.; Karasneh, R. Online learning for undergraduate health professional education during COVID-19: Jordanian medical students' attitudes and perceptions. *Heliyon* **2021**, *7*, e08031. [CrossRef] [PubMed]
57. Daniel, K. Enhancing student engagement in online education: The role of self-regulation and teacher support in Zambia. *Res. Sq.* **2024**. preprint. [CrossRef]
58. Pan, X. Technology acceptance, technological self-efficacy, and attitude toward technology-based self-directed learning: Learning motivation as a mediator. *Front. Psychol.* **2020**, *11*, 564294. [CrossRef] [PubMed]
59. Redjeki, G. EFL undergraduate students' online self-regulated learning strategies during COVID-19 pandemic. *Celt J. Cult. Engl. Lang. Teach. Lit.* **2022**, *9*, 82–96. [CrossRef]
60. Luo, Y.; Lin, J.; Yang, Y. Students' motivation and continued intention with online self-regulated learning: A self-determination theory perspective. *Z. Erzieh.* **2021**, *24*, 1379–1399. [CrossRef] [PubMed]
61. Rahman, L.; Omar, N.; Fazel, F.; Isa, N. Predictors of student satisfaction and perceived learning in online distance learning: The effects of self-efficacy and interaction. *Int. J. Acad. Res. Bus. Soc. Sci.* **2022**, *12*, 785–803. [CrossRef]
62. Barnard, L.; Lan, W.Y.; To, Y.M.; Paton, V.O.; Lai, S.L. Measuring self-regulation in online and blended learning environments. *Internet High. Educ.* **2009**, *12*, 1–6. [CrossRef]
63. Pintrich, P.R. A conceptual framework for assessing motivation and self-regulated learning in college students. *Educ. Psychol. Rev.* **2004**, *16*, 385–407. [CrossRef]
64. Broadbent, J.; Poon, W.L. Self-regulated learning strategies & academic achievement in online higher education learning environments: A systematic review. *Internet High. Educ.* **2015**, *27*, 1–13. [CrossRef]
65. Azevedo, R.; Cromley, J.G. Does training on self-regulated learning facilitate students' learning with hypermedia? *J. Educ. Psychol.* **2004**, *96*, 523. [CrossRef]
66. Hill, J.R. Flexible learning environments: Leveraging the affordances of flexible delivery and flexible learning. *Innov. High. Educ.* **2006**, *31*, 187–197. [CrossRef]
67. Bliuc, A.M.; Goodyear, P.; Ellis, R.A. Research focus and methodological choices in studies into students' experiences of blended learning in higher education. *Internet High. Educ.* **2007**, *10*, 231–244. [CrossRef]
68. Garrison, D.R.; Kanuka, H. Blended learning: Uncovering its transformative potential in higher education. *Internet High. Educ.* **2004**, *7*, 95–105. [CrossRef]
69. Alqurashi, E. Predicting student satisfaction and perceived learning within online learning environments. *Distance Educ.* **2019**, *40*, 133–148. [CrossRef]

70. Sun, P.C.; Tsai, R.J.; Finger, G.; Chen, Y.Y.; Yeh, D. What drives a successful e-Learning? An empirical investigation of the critical factors influencing learner satisfaction. *Comput. Educ.* **2008**, *50*, 1183–1202. [[CrossRef](#)]
71. Paechter, M.; Maier, B.; Macher, D. Students' expectations of, and experiences in e-learning: Their relation to learning achievements and course satisfaction. *Comput. Educ.* **2010**, *54*, 222–229. [[CrossRef](#)]
72. Sahin, I.; Shelley, M. Considering students' perceptions: The distance education student satisfaction model. *J. Educ. Technol. Soc.* **2008**, *11*, 216–223.
73. Artino, A.R., Jr.; Stephens, J.M. Academic motivation and self-regulation: A comparative analysis of undergraduate and graduate students learning online. *Internet High. Educ.* **2009**, *12*, 146–151. [[CrossRef](#)]
74. Landrum, B. Examining students' confidence to learn online, self-regulation skills and perceptions of satisfaction and usefulness of online classes. *Online Learn.* **2020**, *24*, 128–146. [[CrossRef](#)]
75. Tao, D.; Li, W.; Qin, M.; Cheng, M. Understanding students' acceptance and usage behaviors of online learning in mandatory contexts: A three-wave longitudinal study during the COVID-19 pandemic. *Sustainability* **2022**, *14*, 7830. [[CrossRef](#)]

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