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Unravelling Tertiary Students' Perspectives of Moodle Content: A Deep Dive using the ARCS Model

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Abstract

Since COVID-19 onwards, teaching and learning platforms have become in great demand, and Moodle is one of those platforms that could stand remarkable. Consequently, this mixed-methods study was conducted with the aim to critically scrutinize first-year university students' perceptions of English course Moodle content, adopting the meticulously designed 36-item survey called the ARCS (Attention, Relevance, Confidence, and Satisfaction) Model as a quantitative data collection instrument and conducting semi structured interviews with 6 learner users. Through the meticulous descriptive, analytical, and inferential analyses of the data obtained from 107 respondents using SPSS Version 24.0 and the thematic analysis of the interviews, the study could dive deep to assess the efficacy of Moodle in capturing students' attention, enhancing the relevance of course materials, boosting student confidence, and fostering overall satisfaction with the learning experience. Findings revealed a positive relationship between Moodle's functionalities and students' pedagogical needs, demonstrating its capacity to facilitate a dynamic and conducive learning environment. The discussion of the findings also revealed Moodle's impact and its pivotal role in augmenting student engagement and bolstering academic proficiency. Surprisingly, Moodle could create positive, yet moderate, perceptions among the study respondents, as depicted in the mean scores of each domain, but in a reverse pattern of the acronym ARCS, in which satisfaction came first, followed then by confidence, relevance, and attention, respectively. Moreover, some areas for improvement have been unveiled and reported. This study significantly contributes to the ongoing discourse surrounding the pedagogical effectiveness of e-learning platforms. Moreover, it shares actionable insights with Moodle content designers and e-curricula developers to optimize digital learning environments to meet the diverse needs of this high-tech generation.

Keywords: *Moodle, Learning Management System (LMS), ARCS Model, Students Perceptions, Higher Education, E-learning, Language Technologies*

INTRODUCTION

Since COVID-19, the Learning Management System (LMS) has become in great demand. The pandemic has accelerated the adoption of learning digital technologies that accommodate flexibility and adaptability to learners and their needs, utilizing innovative properties to capture learners' attention, covering graded and tailored learning experiences in interactive settings (Iparraguirre-Villanueva *et al*., 2024). One of these platforms is a Modular object-oriented dynamic learning environment which is a learning management system (LMS), known as Moodle. It was developed by Martin Dougiamas, releasing the first version of Moodle 1.0 on August 20th, 2002 to take education beyond physical face-to-face classrooms (Dougiamas, n.d.). Moodle platform soon acquired fame and it has been used by a great number of students and teachers all over the world (Costello, 2013). It was found that Moodle is easy to adapt to different educational requirements which allows educators a very engaging and interesting teaching environment which is the aim of Moodle's emerging to help both educators and learners to create interactive sessions away from the old-fashioned classrooms. Damnjanovic, Jednak and Mijatovic (2013) identify the factors that impact students' choice to use Moodle as interaction, quality expectancy, efficacy, satisfaction, and the nature of the system itself.

Dhofar University (DU) is the largest private university in the south of Oman. It receives a large number of students annually. It seeks to find substantial academic standards and 'aspires to occupy a distinct position among the leading institutions of higher education in the Arab Region' (DU Vision, 2024). The General Foundation Program (GFP), committed to its vision, accommodates almost all the students joining the university to prepare them for different academic majors such as Engineering, Business Administration, Education, and Medicine in the near future. GFP has three courses; English, Mathematics, and Information

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Technology. Students are placed in three different English levels according to a placement test to enable them to study in different colleges whereas students who will study in Law and Social work take only one English course as they will study later in Arabic. All the GFP courses have virtual components for the English course on Moodle as the e-learning platform which enables the students to access learning materials, recorded lectures, general study skills, activities, extra exercises, tasks, and portfolio assignments on the four English skills especially writing and listening where students can do exercises that are automatically checked in a way of self-learning which students can do anytime and anywhere. They access mock exams and even communicate with their teachers and peers through Moodle forums and announcements. Moodle has become an essential requirement for GFP students. Its role has changed over time, but its importance was greater during the spread of epidemic COVID 19 as an e-learning platform.

The main data collection instrument used in this study is the ARCS Model which was founded and developed by John Keller (2010a; b) for measuring instructional Motivation, grounded on the idea of having four key elements in the learning process that can encourage and sustain learners' motivation. These four elements or domains form the acronym ARCS which stands for Attention, Relevance, Confidence, and Satisfaction (ARCS) within the ARCS Model.

Consequently, the primary purpose of this research is to conduct an in-depth investigation, utilizing the ARCS Model, into the perceptions of tertiary-level students in Oman of the materials provided over Moodle as a learning platform. In other words, this study aims to uncover the specific challenges and positive aspects encountered by target students in utilizing Moodle for learning purposes. Furthermore, it seeks to contribute valuable insights by proposing tailored strategies to optimize Moodle, informing strategies to enhance the effectiveness of Moodle in the Omani EFL context.

LITERATURE REVIEW

A study conducted by Ginosyan and Tuzlukova (2015) at Sultan Qaboos University with student participants enrolled in the Foundation Program, namely English language students, to examine whether the Moodle forums are effective and have a positive impact on improving students' writing skills and to identify the students' perceptions of the effectiveness of the forums used on Moodle to improve their writing skills. This study extended from February to June 2014 using a mixed method and constructivist approach. Interviews and questionnaires were used with coordinators, teachers, and 180 students. A virtual class was created which contained a forum where teachers posted tasks and students could use it to share their concerns and feedback in a learner-centered mode where teachers only interfered when the questions were directed to them and when it was necessary. The study concluded that using Moodle forums assists writing fluency, besides allowing students more time to develop ideas and to think about their writing before posting. In addition, these forums promoted a sentiment of purpose and community as students help each other in solving problems as they can ask and answer questions. All that promoted their communication skills.

Moodle has a positive role in e-learning as in one of the studies conducted at 20 different universities in Finland and Sweden by Maslov, Nikou and Hansen (2021) to explore university students' perspectives on LMS as connected to Moodle platform. Their research study sought to decide the main factors that could affect students as users of this platform and the e-learning outcomes as well. They used a mixed method approach, using interviews with 20 students, 10 males and 10 females, and a short survey that contained 24 questions. The results showed that students, especially those who utilized e-learning were totally dependent on this platform and they positively rated Moodle, as an application of LMS. Their most important finding was the impact of the economic factors as learners believed that Moodle "was perceived as a useful and productive platform for learning" (p. 352) as it provided learners an overview of the studied courses with all information by their teachers which facilitated doing their assignments.

Another study by Leone, Mesquita and Lopes (2020) aimed to reach an understanding of how LMS was used in higher education by analyzing two different platforms (Moodle and Sakai) at two universities; a Portuguese and a Brazilian. The research used a mixed-mode methodology of qualitative and quantitative data. There was a questionnaire with open questions for teachers to know their opinion on the importance of LMS besides

collecting data from the usage logs of the platform. There were 6 Brazilian students, 11 Portuguese students, and 6 teachers. The findings showed that both Brazilian and Portuguese students found LMS including Moodle very important for providing the course content, assignments, and online testing. Moreover, both teams showed different opinions towards LMS on some points, for example, the Portuguese students who attended or received a tutorial about how to use LMS found it intuitive, whereas the Brazilian team who did not receive any tutorials found it unintuitive system. Furthermore, both groups had good experiences represented in their ability to access the system anywhere, being able to exchange information and messages with their classmates and teachers, sitting online exams besides the consolidation of content, and the accessibility of supplementary resources. All agreed that in case the teacher was well-informed on how to use the tool, the experiences of learners would be better. They suggested creating certain positions for learners to consult their grades and to standardize the teachers' organizing the support materials.

In her study about Moodle as a didactic tool and its role in active learning for students who study Biology, Gómez-López (2020) stated that there was a rise in the motivation of students and the improvement of the learning outcomes. Through the positive assessment of Moodle, the study suggested that "an active learning strategy using Moodle as a virtual platform could result in an improvement in students' academic performance" (p.1). It used a questionnaire to assess the levels of learners' motivation, confidence, and control of using Moodle, using a Likert Scale. To measure the effect of using Moodle on students' academic performance, it compared the students' results before and after using the platform. Similarly, there is a case study conducted by Das and Sharma (2020) in India on the role of Moodle in order to improve teaching and learning processes in Control System Engineering, where a part of the curriculum content was covered using flipped learning with the assistance of Moodle as a platform. The results of two academic years, 2016/2017 and 2017/2018, were compared which showed great improvement. The findings discussion illustrated how using Moodle had a positive impact on teaching and learning with 70 engineering students since the class outcomes improved as the students' survey showed.

Moodle as a platform has both advantages and disadvantages as shown in a study conducted in Jordan by Al Awabdeh (2021) to investigate the students' and instructors' perspectives on using Moodle. The results of the study were generally positive. It used both qualitative and quantitative methods with a sample that contained 25 instructors and 150 students at the University of Amman's School of English. Moodle was used to upload documents that could be used by students out of the classroom to enhance their learning and for better understanding. The positive influence was shown in enhancing student-centered learning, being able to access anytime and anywhere, simplifying course management, and reducing cost and time. Meanwhile, the negativity was mainly related to internet access and the lack of instructors' and students' training to use the platform.

However, some studies concluded that the learning effects of using Moodle as a learning management system were moderate like the one conducted by Al-Ajlouni (2016) at the Arab Open University with a sample of 1247 students from both genders. It was run using a structured questionnaire that contained 6 themes. The researcher proposed some suggestions and recommendations such as insisting on the modernization linked to Moodle, organizing more workshops for faculty and students for the sake of effective use of Moodle in both teaching and learning, and demanding teachers to encourage their students in all courses to make use of Moodle's advantages. Similarly, one more study by Diogo de Oliveira *et al.* (2022) targeted middle school students to find out how they self-regulated learning when using the Moodle platform. It was found that the 219 students who responded to (SRL-MI) Self-Regulated Learning with Moodle Inventory overestimated the way they self-regulated their learning, and they showed difficulty in reporting strategic planning processes. The researcher concluded that on Moodle, teachers could enhance students' involvement in the learning process through metacognitive guides that could help in planning and controlling strategies to reach goals. They highlighted the importance of technological tools in "promoting opportunities to develop self-regulatory competencies and develop self-study abilities" (p.102). In both cases, it was noted that the age of learners and lack of practice in using Moodle affected the results.

Some factors can play a role in the learners' perceptions of the use of Moodle and how much they accept it as an educational platform as shown in a study in Slovenia by Šumak *et al.* (2011). The data were collected from a sample of 235 Engineering and Computer Science students aged 21-22 who had technical internet skills and

most of them used Moodle daily for 3 to 4 courses. They used Moodle for course enrollment, downloading learning materials, communicating in forums, communicating with their professors, finishing their activities, and checking their grades. An online questionnaire with 22 questions was used to collect the data. The results showed that usage of Moodle relied basically on two major factors: behavioral intentions towards using Moodle and perceived usefulness while the latter was the most powerful predictor of the learners' attitudes towards Moodle's usage. Similarly, other educationalists claimed that other similar factors affected learners' intentions to use Moodle as in Teo *et al.* (2019) in their study in Macau with 564 university students in 9 departments who responded to a survey. The findings illustrated that two main variables; usefulness and ease of use, affected the students' perception towards Moodle with more weight to the convenience.

In the context of research on English as a Foreign Language (EFL) in Oman, focusing on semester 1 tertiary students' perceptions of Moodle as a learning platform utilizing the ARCS Model, there appears to be a notable gap in the existing literature. The targeted context of this study, Omani Higher education, creates a distinct context that warrants dedicated exploration. Understanding how these students, at the initial stages of their English language learning journey, perceive and interact with Moodle is crucial for tailoring effective educational strategies. Moreover, the adoption of the ARCS Model adds a sense of deep dive into the Moodle learning environment, potentially uncovering factors that influence engagement and satisfaction.

Research Questions

Two main research questions have led the current research journey, attempting to find answers to them. They are as follows:

RQ1. To what extent do students rate the motivational factors of Attention, Relevance, Confidence, and Satisfaction regarding their engagement with Moodle?

RQ2. In what ways can Moodle be further optimized to address the specific needs and challenges faced by target students in Level 1?

RESEARCH METHODOLOGY

This study employed a mixed-methods approach in an explanatory sequential design, collecting quantitative and qualitative data sequentially in two phases, with the intent to use qualitative data in Phase 2 for in-depth understanding and to provide more details about the Phase-1 quantitative results (Creswell, 2014; Creswell & Plano Clark, 2011). Two collection instruments were utilized, a questionnaire and semi structured interviews.

Data Collection Instruments

Aiming at investigating FP Semester 1 university students' perceptions of Moodle learning materials facilitated for the English language course, two collection instruments were used in two phases sequentially. In the first phase, quantitative data were collected from the main instrument using the 5-Likert scale questionnaire adopting the validated 36-statement/item ARCS Model survey developed by Keller (2010a; b), grounded in the theoretical underpinnings of motivation and instructional design. The survey encapsulates the four salient domains of the ARCS Model: Attention (12 statements), Relevance (9 statements), Confidence (9 statements), and Satisfaction (6 statements). A total number of 107 students' responses were collected through the Google Forms survey shared through WhatsApp and emails with students. The survey was digitalized using Google Forms and shared through emails and WhatsApp messages, applying a convenience-based random sampling methodology that yielded a cohort of 107 respondents. On the other hand, the second phase collected qualitative data from semi structured interviews with 6 Moodle student users.

Data Analysis Tools

For quantitative data from the questionnaire, the Statistical Package for the Social Sciences (SPSS), version 24.0 was utilized. SPSS was used to descriptively, analytically, and inferentially examine and compare the quantitative dataset, analyzing frequencies, percentages, means, patterns, correlations, and linear regression, among others. In addition, thematic analysis was carried out to scrutinize the qualitative data pooled from semi structured interviews with 6 student users.

VALIDITY & RELIABILITY

On the one hand, the questionnaire's validity was supported by its alignment with Keller's ARCS Model, ensuring criterion validity. Additionally, consulting 3 academicians in the field ensured the construct validity while undergoing a review by 4 professionals established the face validity. These steps collectively contribute to enhancing the overall validity and reliability of the questionnaire used for this study. On the other hand, the reliability statistics were ensured by calculating Cronbach's Alpha for the internal consistency, which demonstrated a satisfactory level of the items' internal consistency within the four domains, with a value of 0.706. An alpha reaching the value of 0.70 is a sufficient measure of the reliability or internal consistency of an instrument (Taber, 2018). For the qualitative data, procedures were taken to ensure the credibility of the responses.

RESEARCH RESULTS & FINDINGS

Quantitative Data Analysis

Demographics

Responses to Section A in the questionnaire brought in the results presented in Table 1.

Table 1 Participants' Demographical Data (n= 107)

S	Category	Variables	N	%
1	Age (years)	Below 15	1	0.9
		15 – 17	3	2.8
		18 – 20	99	92.6
		21-23	3	2.8
		24+	1	0.9
2	Gender	Male	36	33.6
		Female	71	66.4
3	Nationality	Omani	104	97.2
		Non- Omani	3	2.8
4	Internet Efficiency for general uses	Excellent	51	47.7
		Very good	39	36.4
		Good	14	13.1
		Fair	1	0.9
		Poor	2	1.9
5	Experience using Moodle	No previous experience	92	86
		1-2 YEARS	15	14
		3-4 YEARS	0	0
		5-6 YEARS	0	0
		7+ YEARS	0	0

The demographics tabulated in Table 1 summarize the background data of all respondents to the questionnaire. Most respondents, 99 (92.6%), belonged to the 18-to-20 age range while only 1 (0.9%) was below 15, another 1 (0.9%) was above 24, and the rest 6 students (5.6%) were divided equally on the two age groups of 15-17 and 21-23. The number of females (71, 66.4%) was around two times of males. All participants but 3 were Omanis (104, 97.2%). In addition, more than four fifths of the respondents (90, 84.1%) were either excellent or very good at using the Internet for general uses; however, almost the same number (92, 86%) had no previous experience with Moodle, and this was their first time to use that learning platform.

ARCS Findings

The findings of each of the ARCS 4 domains (Attention, Relevance, Confidence, and Satisfaction) are first discussed separately, and then correlation and connections are explored later among all together.

Data Analysis of Attention Domain

As shown in Tables 2 and 3, the descriptive statistics for the Attention domain, based on 107 respondents to 12 items that gave a frequency total of 1284, show a range from 1.00 to 5.00, with a mean score of around 3.2 and a standard deviation of 1.4. The frequency distribution of the data analyzed illustrates that responses are

distributed across the spectrum, ranging from 'Not True' to 'Very True'. On comparing the 1284 frequencies, it is evident that more than half of respondents fell into the categories of 'Moderately True' and 'Very True' with a total of 653 (50.9%) while 'Slightly True' and 'Not True' received only 178 (13.9%) and 226 (17.6%), respectively. This suggests a remarkable level of positive perception of Moodle activities from the scope of attention. This is further supported by the finding out that 68.6% of respondents rated the holistic attention domain of Moodle content in terms of attracting their overall attention at least positively 'Moderately True'.

Table 2 Descriptive Statistics of Attention (n= 107)

	N	Minimum	Maximum	Sum	Mean	Std. Deviation
Attention	1284	1.00	5.00	4083.00	3.1799	1.40577
Valid N (listwise)	1284					

Table 3 Attention Responses Distribution (n= 107)

Attention		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not True	226	17.6	17.6	17.6
	Slightly True	178	13.9	13.9	31.5
	Moderately True	336	26.2	26.2	57.6
	Mostly True	227	17.7	17.7	75.3
	Very True	317	24.7	24.7	100.0
	Total	1284	100.0	100.0	
	Total	1284	100.0	100.0	

Detailed Analysis of Responses to Attention Items

For the 12 items in the survey (As shown in Table 4) related to attention with the numbers: 2, 8, 11, 12, 15, 17, 20, 22, 24, 28, 29 & 31, the mean scores range from approximately 2.67 to 3.6, indicating a generally positive response to these specific aspects of Moodle. For statistical purposes, the rating scale was reversed for the negative items number 12, 15, 22, 29, and 31. Notably, the items related to the quality of materials and the arrangement on screens received higher mean scores, suggesting that these elements are perceived as particularly effective in capturing and maintaining students' attention. In addition, two negative items No. 22 & 29, related to repetition and boredom, received a lower mean score at 2.7 and 2.98 respectively, adding quality to the Moodle well-designed content. However, the negative items number 12 & 15 received an almost border mean score of around 3.4, highlighting potential areas for improvement in the course design.

Table 4 Attention Items Detailed Analysis (n= 107)

Attention Items	Mean	N	Std. Deviation	Median
2. There was something interesting at the beginning of using the course materials over Moodle that got my attention.	3.2430	107	1.30919	3.00
8. The course materials on Moodle were eye-catching.	3.1495	107	1.35844	3.00
11. The quality of the Moodle materials helped to hold my attention.	3.5701	107	1.42823	4.00
12. The course materials on Moodle were so abstract that it was hard to keep my attention on them.	3.3458	107	1.31825	3.00
15. The material on the Moodle screen looked dry and uninteresting.	3.3738	107	1.36343	3.00
17. The way these materials were arranged on Moodle helped keep my attention.	3.1682	107	1.39057	3.00
20. These Moodle materials had things that stimulated my curiosity.	2.9533	107	1.33447	3.00
22. The amount of repetition in these materials caused me to get bored sometimes.	2.6636	107	1.44682	3.00
24. Using Moodle, I learned some things that were surprising or unexpected.	3.1402	107	1.43703	3.00
28. The variety of exercises, illustrations, etc., helped keep my attention on the Moodle content.	3.3271	107	1.37892	3.00
29. The designs of the Moodle interface/dashboard were boring.	2.9813	107	1.47291	3.00
31. There were so many words on each screen that it was irritating.	3.2430	107	1.47201	3.00
Total	3.1799	1284	1.40577	3.00

Data Analysis of Relevance Domain

The descriptive statistics in Tables 5 and 6 for the Relevance domain, based on 963 valid responses (n=107) to 9 items, indicate a range of perceived relevance in students' perceptions of Moodle as a learning platform. The mean relevance score is 3.34, suggesting a moderate level of perceived relevance. The distribution of responses

across the five categories ('Not True' to 'Very True') reflects a diverse range of opinions. The highest frequency of responses falls under the category 'Very True,' with 30.7%. Deep investigation revealed that around 71% of responses range positively between 'Very True' and 'Moderately True'; whereas 28.8% were either 'Slightly True' or 'Not True'. This indicates a substantial proportion of students found the content relevant to their needs while a minority perceived a lack of relevance.

Table 5 Descriptive Statistics of Relevance (n= 107)

	N	Minimum	Maximum	Sum	Mean	Std. Deviation
Relevance	963	1.00	5.00	3220.00	3.3437	1.42346
Valid N (listwise)	963					

Table 6 Relevance Responses Distribution (n= 107)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not True	146	15.2	15.2	15.2
	Slightly True	132	13.7	13.7	28.9
	Moderately True	226	23.5	23.5	52.3
	Mostly True	163	16.9	16.9	69.3
	Very True	296	30.7	30.7	100.0
	Total	963	100.0	100.0	

Detailed Analysis of Responses to Relevance Items

Examining the 9 items, see Table 7, in the survey related to attention with the numbers: 6, 9, 10, 16, 18, 23, 26, 30 & 33 with reversing the rating scale for the negative item number 26, we find notable variations in students' perceptions. For instance, Item 10, which assesses the importance of successfully completing Moodle tasks, received a high mean score of 3.85, indicating strong agreement. On the other hand, negative item No. 26, addressing the perceived irrelevance due to prior practice, received a comparatively lower mean score of 3.16. These variations highlight the nuanced nature of students' perceptions of relevance, regarding aspects such as personal interests, prior experience, and perceived usefulness. However, item 30 which scored the lowest mean score under Relevance (=2.84) drew the attention that some students lack the link of Moodle activities to their own lives.

Table 7 Relevance Items Detailed Analysis (n= 107)

Relevance Items	Mean	N	Std. Deviation	Median
6. It was clear to me how the content of Moodle was related to things I already knew.	3.3084	107	1.46925	3.00
9. There were pictures, or examples that showed me how the course materials on Moodle could be important to us.	3.2897	107	1.47309	3.00
10. Completing the course tasks successfully on Moodle was important to me.	3.8505	107	1.30170	4.00
16. The content of these activities was relevant to my interests.	3.1028	107	1.39361	3.00
18. There were explanations or examples of how users could use the activities in each lesson on Moodle.	3.5701	107	1.31114	4.00
23. The content and style of presentation on Moodle conveyed the impression that its content was worth knowing.	3.3178	107	1.43144	3.00
26. These Moodle activities were not relevant to my needs because I already practiced most of them before that.	3.1589	107	1.47399	3.00
30. I could relate the content of Moodle activities to things I have seen, done, or thought about in my own life.	2.8411	107	1.36775	3.00
33. The content of Moodle activities will be useful for me.	3.6542	107	1.36051	4.00
Total	3.3437	963	1.42346	3.00

Data Analysis of Confidence Domain

Analyzing the Confidence domain, derived from 963 responses (n=107 * 9 items), reveals insights into students' self-assurance towards Moodle as a learning platform (See Tables 8&9). The mean confidence score is 3.52 (*SD*1.32), indicating a generally moderate level of confidence. The distribution of responses across the five

categories, 'Not True' to 'Very True', illustrates a diverse range of opinions, with 'Very True' having the highest frequency at 31.4% (302 responses), showcasing a significant proportion of students expressing a high level of confidence. This is further supported when combining all the three positive responses of 'Very, Mostly & Moderately True' whose total results reached almost four fifths or exactly 751(around 78%) responses. Conversely, 'Not True' accounts for only 10.8%, and it together with 'Slightly True' counts 212 (around 22%) responses which indicates a minority with lower confidence levels.

Table 8 Descriptive Statistics of Confidence (n= 107)

	N	Minimum	Maximum	Sum	Mean	Std. Deviation
Confidence	963	1.00	5.00	3390.00	3.5202	1.32321
Valid N (listwise)	963					

Table 9 Confidence Responses Distribution (n= 107)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not True	104	10.8	10.8	10.8
	Slightly True	108	11.2	11.2	22.0
	Moderately True	236	24.5	24.5	46.5
	Mostly True	213	22.1	22.1	68.6
	Very True	302	31.4	31.4	100.0
	Total	963	100.0	100.0	

Detailed Analysis of Responses to Confidence Items

Table 10 presents the Confidence 9 items' individual analysis, numbers: 1, 3, 4, 7, 13, 19, 25, 34 & 35 with reversing the rating scale for the negative items numbers 3, 7, 19, and 34. It shows variations in students' confidence levels. For example, Item 1, addressing the easiness of course materials over Moodle, received a mean score of 3.40, suggesting a moderate level of agreement. In contrast, Item 7, related to information overload on the computer screen, received a mean score of 3.10, indicating a more neutral stance. These variations highlight the multifaceted nature of students' confidence, influenced by factors such as perceived difficulty, understanding, and aspects of organizing the activities.

Table 10 Confidence Items Detailed Analysis (n= 107)

Confidence Items	Mean	N	Std. Deviation	Median
1. My first impression about the course materials over Moodle was that they would be easy for me.	3.4019	107	1.08905	3.00
3. These materials over Moodle were more difficult to understand than I would like them to be.	3.7196	107	1.30163	4.00
4. After watching the introductory information, I felt confident that I knew what I was supposed to learn from the course materials over Moodle.	3.6355	107	1.19269	4.00
7. My dashboard on Moodle showed so much information that it was hard to pick out and remember the important points.	3.1028	107	1.46619	3.00
13. As I worked on, the course materials on Moodle, I was confident that I could learn the content successfully.	3.7009	107	1.29013	4.00
19. The exercises on Moodle were too difficult.	3.6075	107	1.41259	4.00
25. After working on Moodle activities for a while, I was confident that I would like to be able to pass a test on them.	3.3738	107	1.41770	4.00
34. I could not really understand quite a bit of the material presented on Moodle.	3.5421	107	1.33374	4.00
35. The good organization of the content helped me be confident that I would learn from Moodle activities.	3.5981	107	1.29484	4.00
Total	3.5202	963	1.32321	4.00

Data Analysis of Satisfaction Domain

The descriptive statistics for the Satisfaction domain, as given in Tables 11 & 12, reveal a mean score of almost 3.6 (*SD* 1.41) of the 642 responses (n=107 * 6 items), indicating a moderate level of variability among student

responses. The frequency distribution demonstrates a relatively diverse distribution, with the highest percentage of students falling into the category of 'Very True', about 39%, giving a total of 497 (77.4%) responses if added to the rest two positive rates of 'Mostly True' and 'Moderately True'. This result reflects generally positive sentiments toward the activities on the Moodle platform. On the other hand, 'Slightly True' and 'Not True' received all in all 145 (22.6%).

Table 11 Descriptive Statistics of Satisfaction (n= 107)

	N	Minimum	Maximum	Sum	Mean	Std. Deviation
Satisfaction	642	1.00	5.00	2305.00	3.5903	1.40717
Valid N (listwise)	642					

Table 12 Satisfaction Responses Distribution (n= 107)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not True	81	12.6	12.6	12.6
	Slightly True	64	10.0	10.0	22.6
	Moderately True	142	22.1	22.1	44.7
	Mostly True	105	16.4	16.4	61.1
	Very True	250	38.9	38.9	100.0
	Total	642	100.0	100.0	

Detailed Analysis of Responses to Satisfaction Items

Table 13 provides a more detailed analysis of each item under the Satisfaction domain. There were only 6 positive items for confidence numbered 5, 14, 21, 27, 32 and 36. Striking high mean scores of most Satisfaction items (5 out of 6) ranging from 3.3 to 4.0, it is evident that students express satisfaction with various aspects of Moodle, such as enjoying the materials, finding them rewarding, and appreciating well-designed activities. Notably, Item 5, "Completing the exercises on Moodle gave me a satisfying feeling of accomplishment", received the highest mean score, suggesting that students find a sense of achievement in completing Moodle activities. However, Item 14, "I enjoyed the materials on Moodle so much that I would like to know more about it", received a relatively lower mean score (3.25), indicating a potential area for improvement. Overall, the positive average mean score of 3.59 for satisfaction items suggests that Moodle contributes to a satisfying learning experience for students.

Table 13 Satisfaction Items Detailed Analysis (n= 107)

Satisfaction Items	Mean	N	Std. Deviation	Median
5. Completing the exercises on Moodle gave me a satisfying feeling of accomplishment.	4.0000	107	1.36672	5.00
14. I enjoyed the materials on Moodle so much that I would like to know more about it.	3.2523	107	1.43470	3.00
21. I really enjoyed studying on Moodle.	3.3084	107	1.45635	3.00
27. The wording of feedback after the exercises, or of other comments on Moodle, helped me feel rewarded for my effort.	3.4953	107	1.38301	4.00
32. It felt good to successfully complete the course materials and tasks over Moodle.	3.7196	107	1.32319	4.00
36. It was a pleasure to work on such well-designed tasks and activities through Moodle.	3.7664	107	1.35688	4.00
Total	3.5903	642	1.40717	4.00

All Four Domains (ARCS) & Research Question 1

Attempting to grasp the comprehensive picture of the relationship among all four domains in the ARCS Model used in this study, a calculation was made to compare the mean scores of Attention, Relevance, Confidence, and Satisfaction as shown in Table 14. This is done to answer RQ1 which is to find out to what extent students rate the motivational factors of Attention, Relevance, Confidence, and Satisfaction regarding their engagement with Moodle.

Table 14 Comparing Means of the ARCS Model Domains

	Attention	Relevance	Confidence	Satisfaction
Number of items	1284	963	963	642
Mean	3.1799	3.3437	3.5202	3.5903

Std. Deviation	1.40577	1.42346	1.32321	1.40717
Skewness	-.168-	-.295-	-.484-	-.554-
Std. Error of Skewness	.068	.079	.079	.096
Kurtosis	-1.196-	-1.201-	-.877-	-.980-
Std. Error of Kurtosis	.136	.157	.157	.193

The means of the four ARCS domains, Attention, Relevance, Confidence, and Satisfaction, show distinct patterns in students' perceptions of the Moodle learning platform. On a scale of 1 to 5, students exhibit a moderate level of engagement within Attention with a mean of around 3.2 (*SD* 1.4). This suggests that while students generally find certain elements interesting or attention-grabbing, there is room for improvement to enhance the overall appeal and captivation within the platform. Moving to Relevance, the mean score of around 3.3 (*SD* 1.4) indicates a moderately positive perception regarding the alignment of Moodle content with students' existing knowledge and interests. However, there is potential for further tailoring of materials to enhance their relevance.

Shifting the focus to Confidence, the mean score stands at around 3.5 (*SD* 1.3), signifying a moderate level of students' confidence in their ability to navigate and succeed in Moodle-based activities. This suggests a positive perception of the platform's usability, but there may be opportunities to boost students' confidence further. Finally, in the domain of Satisfaction, the mean of almost 3.6 (*SD* 1.4) reflects a generally positive outlook among students and qualifies Satisfaction to come first among the 4 domains. Nevertheless, there is always room for improvement and here it is linked to enhancement of satisfaction levels.

Despite all the differences concluded among the four domains of the ARCS Model used in this research, a correlation could be found through calculating inferential statistics as projected in the correlation shown in Table 15 and the linear regression analysis in Tables 16-18.

Table 15 Correlation among the ARCS Model Domains

		Attention	Relevance	Confidence	Satisfaction
Attention	Pearson Correlation	1	.339**	.337**	.435**
	Sig. (2-tailed)		.000	.000	.000
	N	1284	963	963	642
Relevance	Pearson Correlation	.339**	1	.267**	.521**
	Sig. (2-tailed)	.000		.000	.000
	N	963	963	963	642
Confidence	Pearson Correlation	.337**	.267**	1	.276**
	Sig. (2-tailed)	.000	.000		.000
	N	963	963	963	642
Satisfaction	Pearson Correlation	.435**	.521**	.276**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	642	642	642	642

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

The correlation matrix depicted in Table 15 examines the relationships among the four domains of the ARCS model, namely Attention, Relevance, Confidence, and Satisfaction. The Pearson correlation coefficients reveal statistically significant associations between these domains. Specifically, the correlation between Attention and Relevance is 0.339**, Attention and Confidence is 0.337**, and Attention and Satisfaction is 0.435**. Additionally, the Relevance and Confidence domains show a correlation of 0.267**, Relevance and Satisfaction exhibit a strong correlation of 0.521**, and the Confidence and Satisfaction domains are correlated at 0.276**. Finally, all correlation coefficients have a significance level of .000, indicating a robust statistical significance. In a nutshell, all four domains are internally correlated and connected to a significant degree.

Table 16 ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	301.307	3	100.436	71.866	.000[b]
	Residual	891.628	638	1.398		

Total	1192.935	641				

a. Dependent Variable: Attention
b. Predictors: (Constant), Confidence, Satisfaction, Relevance

Table 17 Linear regression analysis

Coefficients[a]										
		Unstandardized Coefficients		Standardized Coefficients			Correlations			Collinearity Statistics	
Model		B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	1.075	.165		6.501	.000					
	Relevance	.201	.040	.208	5.086	.000	.403	.197	.174	.699	1.430
	Satisfaction	.275	.039	.284	7.010	.000	.435	.267	.240	.713	1.402
	Confidence	.159	.038	.153	4.201	.000	.295	.164	.144	.887	1.127

a. Dependent Variable: Attention

Table 18 Collinearity Diagnostics[a]

				Variance Proportions			
Model	Dimension	Eigenvalue	Condition Index	(Constant)	Relevance	Satisfaction	Confidence
1	1	3.770	1.000	.01	.01	.01	.01
	2	.105	5.990	.05	.25	.17	.49
	3	.068	7.424	.09	.73	.55	.07
	4	.056	8.181	.86	.01	.27	.43

a. Dependent Variable: Attention

An inferential statistic (i.e., linear regression analysis) was conducted to predict the future correlation set in Table 15. The overall model as depicted in Tables 16 to 18 was statistically significant ($F(3, 638) = 71.866$, $p < 0.001$) and explained 25.3% ($R^2 = 0.253$) of the variance in Attention. All three independent variables (Relevance, Confidence, and Satisfaction) significantly contributed to the model with positive standardized coefficients (Relevance: $\beta = 0.208$, $p < 0.001$; Satisfaction: $\beta = 0.284$, $p < 0.001$; Confidence: $\beta = 0.153$, $p < 0.001$), indicating that an increase in these variables led to a positive change in Attention. Collinearity diagnostics showed acceptable levels of multicollinearity, ensuring the stability of the regression. Noteworthy, the linear regression analysis was also run two times more with Confidence and Satisfaction as dependent variables, giving similar significant results.

Qualitative Data Analysis

Semi structured interviews were conducted with 6 student users (coded as P1– P6). Interviewees were asked one main question: 'What do you think of Moodle tasks and learning materials for the English course?', followed by encouraging students to elaborate and add more details. Then, the transcripts were carefully explored while encoding data. The thematic analysis of the encoded interviews uncovered three main themes that emerged from decoding the pooled data.

The first theme (1.0–1.6) focused on the positive features of Moodle, the second one (2.0–2.6) highlighted the areas for improvement, and the last theme (3.0–3.6) extended to provide solutions and suggestions to the challenges, as shown in Table 19:

Table 19 Encoded Themes

No.	1.0 Positive features of Moodle	2.0 Areas for improvement	3.0 Solutions & suggestions
P1	1.1 "…attractive, saves time of completing tasks, and can be accessed anywhere"	2.1 "…occasionally downtime, especially when at full capacity of users.."	3.1 "…enhancing the platform to meet pressure and accommodate all users without malfunctions"
P2	1.2 " …rich learning materials shared with students, ..makes it up if one misses a class"	2.2 " …too many tasks and portfolio assignments that bear scores such as, vocabulary tasks; some students may write just for marks without understanding the task .."	3.2 " ..vocabulary tasks better not to bear marks, dictation in class is better or be in the form of an interactive game for enthusiasm.."
P3	1.3 "…very useful tool, facilitates learning and comprehension, and the activities there help development and learning…"	2.3 *No response*	3.3 *No response*
P4	1.4 "… can refer back to if I miss a class, various activities and practices.."	2.4 "… a student may depend solely on it, so might miss a lot of classes and become	3.4 " ..linking the Meet App for teacher-students sessions.."

		careless, a student may not have internet connection.."	
P5	1.5 " ..easy to use, well-designed, well-located and distributed tasks and specific tabs for units, quizzes, etc., each course has its own course page on the dashboard.."	2.5 *No response*	3.5 "… some more images or lesson excerption as a reference to students whenever .. would like.."
P6	1.6 " …various learning aids, different resources such as videos, activities, and practices, flexibly accessible anytime and anywhere.."	2.6 " … lack of immediate personal teacher-students interaction, and not providing comprehensive assessment to learners' language performance.. this can hinder identifying weakens areas.."	3.6 "…adding interactive tasks through synchronous live online teaching or advising sessions, tailoring streams based on learners' needs and goals, and offering personal guidance to students on Moodle"

The encoded data in Table 19 shed light on some insights concerning the perceptions and experiences of Moodle student users. Repeating phrases such as 'attractive, well-designed, saves time, can be accessed anywhere, among others', resulted in extracting 5 positive properties of Moodle as reflected in users' perceptions, including Moodle's attractiveness *(frequency (F) =2)*, time-saving attributes *(F=1)*, accessibility *(F=4)*, the rich learning materials posted *(F=4)*, and convenience *(F=2)*, with accessibility and the rich materials scoring the highest frequency.

Nevertheless, 7 areas for improvement were detected, namely occasional downtime during peak usage periods *(F=1)*, some excessive workload *(F=1)* leading to potential superficial engagement, especially related to vocabulary score-oriented assignments *(F=1)*, spoonfeeding that might lead to carelessness *(F=1)*, unavailability of the internet *(F=1)*, and some limitations in immediate personal interaction *(F=1),* and comprehensive language assessment *(F=1)*. Surprisingly, each area for improvement was detected only once in users' responses.

Finally, 3 main solutions were proposed by interviewees to tackle the challenges as extracted through decoding data. These suggestions covered areas such as enhancing the platform *(F=1)*, enriching the platform with activities *(F=4)* such as interactive tasks, competitive games, coursebook excerptions, and attractive images, and lastly equipping the Moodle platform with live streaming sessions *(F=2)*, for tutoring and advising through a link to the Meet App or synchronous live online teaching or advising for personal guidance.

DISCUSSION

While further discussing the four domains of the ARCS Model used to investigate learners' instructional motivation for Moodle learning tasks and the thematically scrutinized data from semi structured interviews, answers to RQ2 (RQ1 was answered earlier but further supported here) are discussed to explore ways by which Moodle can be further optimized to address the specific needs and challenges faced by target students in Level 1.

Attention domain results indicate an overall positive perception. Course designers are urged to explore elements contributing to this engagement to further enhance attention in online learning environments effectively. Regarding Relevance, the study indicates a moderate mean score, suggesting alignment between Moodle's content and students' perceived needs. Variations in responses, however, emphasize the importance of personalized learning experiences to enhance relevance universally. Tailoring content to diverse interests and experiences would create a more relevant learning milieu and make improvements in content design and delivery. In terms of Confidence, the study notes a moderately high mean score. Additional tailored tasks and learning materials can boost student confidence in practicing Moodle activities. Balancing challenge levels will contribute to fostering a sense of accomplishment and confidence among students. Moreover, Satisfaction scores highest, underscoring the importance of creating a positive learning experience. Continuous refinement of Moodle tasks is vital to meeting students' satisfaction and engagement expectations, necessitating ongoing improvement in features and functionalities to align with evolving preferences. Furthermore, correlations among ARCS model domains suggest an interconnectedness influencing student perceptions of Moodle, emphasizing the holistic nature of engagement, and urging educational designers to address multiple facets effectively.

Surprisingly, Moodle could create positive perceptions among the study respondents, as depicted in the mean scores of each domain, but in a reverse pattern of the acronym ARCS, in which satisfaction came first, followed

then by confidence, relevance, and attention, respectively, forming the reversed form SCRA. However, the study's regression analysis uncovers a meaningful association between students' attention in the Moodle environment and the dimensions of relevance, satisfaction, and confidence. Increased attention correlates with students' perception of content relevance, overall satisfaction with Moodle, and confidence in platform navigation. This underscores how interconnected ARCS model domains shape student engagement. Tailoring interventions based on these insights enables course designers to boost the relevance of course materials, enhance user satisfaction, and bolster confidence in navigating Moodle. Ultimately, this fosters a more attentive and engaged online learning environment for students.

Furthermore, students, generally, appreciated Moodle's learning materials, assignment tasks, user-friendly interface, and well-organized resources, yet expressed a desire for more visual aids and personalized learning experiences. Qualitative data from interviews further underscores the importance of enhancing platform stability, refining assessment strategies, and integrating interactive elements to foster deeper engagement and personalized learning experiences. Proposed solutions encompass optimizing platform functionality to accommodate user demand under all conditions, reconsidering the assessment structure to promote meaningful learning, and incorporating interactive tasks and synchronous sessions to facilitate real-time interaction and personalized guidance.

Despite some differences in research instruments and/or contexts, the current study aligns with most previous research in concluding that students perceived Moodle positively and stated that Moodle learning tasks and activities were useful and accessible anytime and anywhere. The main contrast that could be detected is the degree of positive perception. Stating this, this study's findings were similar to earlier studies by Ginosyan and Tuzlukova (2014) which had the same context yet a different institution, Šumak *et al.* (2011), Leone, Mesquita and Lopes (2020), Gómez-López (2020), and Maslov, Nikou and Hansen (2021). The notion of a 'sense of purpose and community' in the study by Ginosyan and Tuzlukova (2014) can be linked to relevance and satisfaction in the present research. However, the moderate positive degree in some ARCS domains is in the same vein as Al-Ajlouni's (2016) and Diogo de Oliveira *et al.*'s (2022) in terms of difficulty level in some learning tasks on Moodle. In a nutshell, a distinctive feature of the current study is the adoption of the ARCS model aided by semi structured interviews; however, the findings were at the same bar as most literature.

CONCLUSION & RECOMMENDATIONS

The primary objective of this research is to conduct an in-depth investigation into the perceptions of level 1 tertiary students in Oman of the English course materials provided over Moodle as a learning platform, aiming to identify positive aspects and challenges encountered by student users. Through the application of the ARCS Model questionnaire and the semi structured interviews, the study reveals distinct patterns of students' positive perceptions across the domains of Attention, Relevance, Confidence, and Satisfaction. The study findings highlight the significance of boosting a positive learning experience by focusing on these motivational factors and proposing tailored strategies to further optimize Moodle in the Omani higher education context.

By employing the ARCS Model in the context of Moodle-based language learning, this research makes a significant contribution to the field of applied linguistics and online learning platforms. The study not only provides valuable insights into students' perceptions but also establishes a reliable instrument for future research endeavors. The study, in addition, offers practical implications for instructional designers and educators, suggesting the importance of creating engaging content, ensuring material relevance, and building student confidence in utilizing the platform to meet stakeholders' satisfaction. The study recommends progressive training (as in Poulsen *et al.*, 2008) for instructors and students, continuous assessment, and refinement of course content based on students' feedback to sustain a positive and engaging online language learning environment. Noteworthy, a lot of updates and changes have already been carried out to Moodle course materials at the GFP after collecting these data. However, this study's findings can further help utilize Moodle materials to the most. Consequently, future research is encouraged to follow up on the effectiveness of those changes and updates made.

Authors' contributions

All authors contributed equally to all this study journey steps; planning, drafting, preparing, methodology and procedures, documentation, data collection, analysis, discussion, etc. and the writing of this manuscript from Introduction to the conclusion and the reference list.

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Declarations

Throughout all stages and procedures of the current research, guidelines and regulations of the 1963 Helsinki Declaration and its later amendments were considered and followed.

Human Ethics and Consent to Participate Declarations

This study followed the guidelines and bylaws issued by the authors' higher education institution that meticulously went through the approval procedures by the Department Research Committee and then the University Research Department. Dhofar University Research Council (URBC) approved that this study meets the ethics criteria and approved means and methods of data collection. In addition, all participants' consent was obtained at the onset of data collection while maintaining their full liberty to participate or not and the option to withdraw and excluding their responses at any stage of research. Participants' identities were kept confidential and anonymous without fail.

Data Availability Declaration

All data and material are included in the manuscript. We do not have any other data available somewhere else.

Competing interest Declaration

No conflict or compete interests of any kind is applicable to this manuscript whether financial or non-financial**.**

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