Teachers' and Students' Perception Regarding the Use of Moodle

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Abstract: This paper seeks to analyse the perceptions of students and teachers regarding the factors that influence satisfaction and the intention to continue using Moodle. An approach that integrates DeLone and McLean's Information Systems Success Model to Davis' Technology Acceptance Model is used. The two models are widely used in research related to the context of e-learning. A quantitative methodological approach was assumed, based on the post-positivist paradigm. Data collection was carried out employing a self-administered questionnaire developed in Google Forms. Descriptive analysis techniques were applied for the data analysis of 144 valid questionnaires. The results showed that teachers and students have a positive perception of the ease of use and usefulness of Moodle, besides evidencing those users are satisfied and intend to continue using Moodle. This research contributes to the formation of knowledge about the perception of Moodle users as support for classroom teaching, providing helpful information for educational institutions, researchers, managers, administrators, and designers of e-learning systems.

1 INTRODUCTION

With the development of Information and Communication Technologies (ICT) and the popularisation of the Internet, the use of Learning Management Systems (LMS), also known as Virtual Learning Environments (VLE), have been gradually growing in educational institutions. VLE has been used as a space to contribute and support the development of the teaching and learning process, meeting the needs and contemplating each individual's pace who actively participates in that process.

In Brazil, the use of VLE, such as Moodle, to offer distance or semi-attendance education has been significantly expanded (Cardoso, 2016) after the approval of the Law of Directives and Bases of Education (LDB) nº 9394/96, which regulates the practices of Distance Education (DE) in regular education, and the Ordinances 2253/01 and 4059/04 of the Ministry of Education (MEC), which allow educational institutions to offer up to 20% of the workload of their courses with no presential

activities. Many Higher Education Institutions (HEI) have adopted VLE in their pedagogical projects (Bedregal-Alpaca et al., 2019), both in online courses and for support to face-to-face courses, stimulating the use of new technologies and ways of learning beyond the confines of the classroom.

Within the Federal Institute of Education, Science and Technology of Rondônia (IFRO), the Vilhena Campus was a precursor in the implementation of Moodle. Since 2015 it has been used to complement the workload of integrated technical courses, with the offer of up to 20% of the workload in VLE. In the following years, the model was also implemented in the other undergraduate courses of the Campus. From March 2020, with the advent of the new Covid-19 and the consequent adoption of remote learning, the classes were taught entirely in distance learning format, with content and materials being made available through Moodle. However, aspects of how Moodle is used and its users' perceptions have never been formally investigated so far within the institution.

Given the above, this study has as the main objective to analyse the perceptions of students and

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teachers regarding the factors that influence the satisfaction and the intention to continue using Moodle. In addition, we also seek to analyse the frequency of use of Moodle activities and resources, by teachers, in undergraduate courses in IFRO - Campus Vilhena.

The structure for the rest of the paper is the following. Firstly, some related topics are introduced. Next, the methodology is described. Results are presented and discussed in the following sections. The article finishes with the conclusion.

2 RELATED TOPICS

2.1 Virtual Learning Environment (MOODLE)

For its flexibility and customisation (Batista, 2016), VLE enable synchronous (when it happens in real-time) and/or asynchronous (when it does not happen in real-time) interaction in face-to-face, distance or semi-presence courses or subjects (Sebastião, 2015; Sobreira, 2013). They can also be used to provide content or materials and allow the management of courses (Sebastião, 2015).

WebCT, developed by Murray Goldberg in 1996, was the world's first successful VLE for higher education. It was used by more than 10 million students at its peak in over 2,500 universities in 80 countries (UBC Computer, 2004). Currently, several systems of this category are available in the market, emphasising Blackboard, of commercial nature, and Moodle, a free and open-source system that allows adaptations or modifications in its code (Batista, 2016). Moodle, an acronym for Modular Object-Oriented Dynamic Learning Environment, is a platform created to support the processes of teaching and learning at a distance, developed in 1999 by educator and computer scientist Martin Dougiamas in his doctoral research at the Science and Mathematics Education Centre, Curtin University of Technology, Perth, Australia. Currently, Moodle is the most used VLE globally, standing out as an important tool to support the teaching and learning process (Costa et al., 2017). Currently, with version 3.10, Moodle has 261 million users, 35 million courses and 179,000 sites in 243 countries (Moodle, 2020). Moodle allows the simulation of various classroom situations, providing a set of activities and resources that enable and optimise synchronous and asynchronous interaction between teachers and students (Sebastião, 2015). Despite this, previous research indicates that the platform's resources and activities are under-

utilised, i.e. not used or used by a minimal number of teachers (Badia et al., 2019; Batista, 2016; Rodrigues, 2020).

2.2 Factors Related to Satisfaction and Continuity of Moodle Use

Davis' (1989) Technology Acceptance Model (TAM) is the most widely used theory in e-learning acceptance research, with 86% of studies using this model as a base theory (Šumak et al., 2011). TAM has been configured as one of the most used models in studies that aim to explain and predict the individual acceptance of technologies based on users' perceptions (Al-Azawei et al., 2017; Pires & Costa Filho, 2008; Šumak et al., 2011; Surendran, 2012). TAM has been widely extended, employing different variables. It has also been used successfully to explain usefulness and use in different contexts, including e-learning (Al-Fraihat et al., 2020; Surendran, 2012. Studies conducted in the context of e-learning systems have used TAM to predict the usefulness, intention to use and usage of e-learning systems. (Al-Fraihat et al., 2020). Thus, TAM constitutes an adequate model to study the factors that influence users' decision to use a specific e-learning technology (Šumak et al., 2011). However, Bedregal-Alpaca et al. (2019) highlight the need to add to TAM other external variables that directly influence perceived usefulness and ease of use.

After reviewing 180 research articles, published from 1981 to 1987, DeLone and McLean (1992) constituted a model to measure the success of Information Systems (IS) (Al-Fraihat et al., 2020). The model relates the aspects of system quality and information quality with the use and satisfaction of the user concerning the system and considers that these factors affect the individual and organisational impacts caused by the use of the system. After ten years, the model was revised. DeLone and McLean (2003) found theoretical evidence that service quality positively influences user use and satisfaction and is also a determinant of success (Cidral et al., 2018). Although this model was developed in an organisational context (Dağhan & Akkoyunlu, 2016), researchers have adopted it, including in e-learning systems. This was made either partially, entirely, in extended form, or integrated with another model to estimate various information systems' success, use, and continuity (Wang & Chiu, 2011).

The literature review demonstrated that TAM is the most widely used theory in e-learning. It is also widely extended, being used as the base theory in most studies. However, TAM seeks to determine and

explain acceptance and use but not assess user satisfaction. Hence, integration with the IS Success Model proves valid since this model has also been adopted in the e-learning contexts.

3 METHODOLOGY

This research proposes several variables that result from the integration of the variables of TAM (1989) and the variables information quality and satisfaction of the IS Success Model (2003) to analyse the perception of students and teachers of undergraduate courses in IFRO - Campus Vilhena, regarding the satisfaction and the intention to continue using Moodle. Table 1 presents the definition of each of the analysed variables. The study adopted a quantitative approach. Data collection was conducted by means of a self-administered questionnaire developed in the Google Forms tool made available to participants via the Internet. The data collection instrument was based on the IS Success Model (DeLone & McLean, 2003) and TAM (Davis, 1989). It encompasses five variables, as stated in table 1, namely Quality of Information (QI), Perceived Ease Of Use (PEOU), Perceived Usefulness (PU), User Satisfaction (US), and Behavioural Intention to use (BI).

Table 1: Definition of the analysed variables.

	Definition	Model/Author
QI	Quality of the information that the system can store, deliver or produce.	IS Success Model (DeLone & McLean, 2003).
PEOU	The degree to which a person believes that using a particular system would be free of effort.	TAM (Davis, 1989; Davis et al., 1989) e TAM 2 (Venkatesh & Davis, 2000).
PU	The degree to which a person believes that using a particular system would enhance his or her job performance.	TAM (Davis, 1989; Davis et al., 1989)
US	The degree to which a person believes that using a particular system will improve their job performance.	IS Success Model (DeLone & McLean, 2003).
BI	Users' intention regarding the continued use of the information system.	TAM (Davis, 1989; Davis et al., 1989)

Notes: Quality of Information (QI); Perceived Ease Of Use (PEOU); Perceived Usefulness (PU); User Satisfaction (US); Behavioural Intention to use (BI).

Two data collection instruments were designed because some questions regarding the characterisation of the participants were specific to each of the categories (teachers and students). Both questionnaires were composed of two sections. The first section comprises a set of questions regarding the characterisation of the participants. The second section integrates the various statements referring to the five variables under analysis (see appendix). For the sample characterisation, we considered aspects such as gender, age, ICT domain and frequency of Moodle use, common to all participants; marital status and occupation, exclusive to students; training base, degree, teaching time and frequency of use of Moodle resources, exclusive to teachers. In order to ensure the suitability and correct context of the present research, the statements were developed from previous studies related to e-learning (Al-Fraihat et al., 2020; Chiu et al., 2005; Dağhan & Akkoyunlu, 2016; Davis et al., 1989; DeLone & McLean, 2003; Pereira et al., 2015; Roca et al., 2006; Venkatesh et al., 2003) and adapted to the context of this study, besides being adjusted according to the target audience of each instrument; since, according to Davis et al. (1989), the analysis of the adoption of a technology or innovation should be adjusted to the context to which it is submitted. All statements that comprise the questionnaire were arranged in a Likert scale of 5 points, with the anchors being "Strongly Disagree" and "Strongly Agree", being "Neutral or Uncertain" the intermediate position. On a Likert scale, the participant is asked to respond to each of the statements in varying degrees of agreement or disagreement. Each answer receives its own numerical score to measure the respondent's favourable or unfavourable attitude. Thus, it is possible to measure attitudes, perceptions, and know the respondent's degree of agreement with the proposed statements in the survey instrument (Kothari, 2004).

The population comprised 76 teachers and 201 students of higher education courses of IFRO - Campus Vilhena. The choice of this institution was based on the convenience and judgment of the researcher; therefore, it was not probabilistic. A simple random sample technique was used since the questionnaire was sent to all individuals in the population. Therefore, each subject had an equal opportunity to be included in the sample (Prodanov, 2013).

Data were analysed by applying descriptive statistical techniques using IBM SPSS Statistics (v. 26).

4 RESULTS

4.1 Sample Characterisation

The final sample consisted of 144 (n = 144) valid questionnaires, 44 from teachers and 100 from students, corresponding to a net response rate of 57.89% and 49.75%, respectively. The total net response rate was 51,99%

4.2 Teachers' Characterisation

The percentage of male teacher respondents was 65.9%, while only 34.1% were female. As for the age group, teachers aged between 36 and 45 comprised 40.9% of the sample, followed by teachers aged between 26 and 35 (34.1%). Concerning their higher education background, 50% of the teachers hold a licentiate degree, followed by 34.1% who hold a bachelor's degree. About post-graduate degrees, 45.5% of the respondents hold a Master's degree, and only 25% of the teachers hold a PhD. Regarding the length of time working as a teacher, most teachers (52.3%) have more than eleven years of experience. Finally, only 2.3% of the teachers consider they have insufficient mastery in ICT use. We also investigated which Moodle resources and activities are most used by teachers. According to the results illustrated in Figure 1, the most frequently used activities are assignment and quiz. Most teachers never or rarely used glossary, workshop, and database activities.
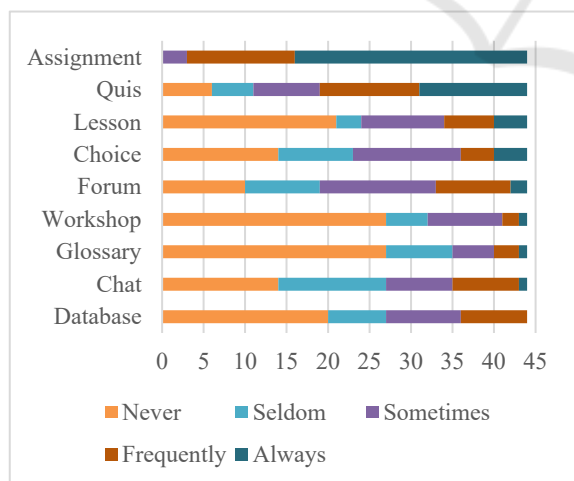

Figure 1: Activities.

As illustrated in Figure 2, the most frequently used resources are file and URL. Notably, book is the resource used less frequently by most teachers.
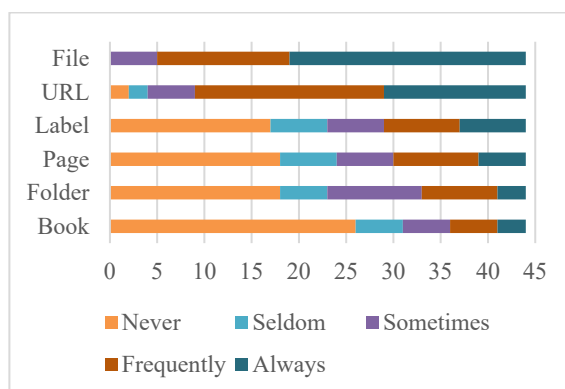

Figure 2: Resources.

4.3 Students' Characterisation

As for the students, there was a higher representation of women, totalling 67% of the sample. Regarding marital status, most (63%) were single, while only 29% were married. Regarding occupation, 50% of the respondents did not work. As to the age group, respondents aged 18 to 25 formed the majority, comprising 61% of the sample. Only 3% of the respondents considered they had insufficient mastery of ICT use. Finally, 46% of students used Moodle daily, and 44% used Moodle a few times a week.

4.4 Teachers' and Students' Perceptions on using Moodle

To verify whether teachers and students have a negative or a positive perception of the five considered variables, an analysis of the frequency of teachers' and students' responses to the statements that make up each variable was carried out. Considering the scale used, the answers in levels 1 and 2 (Strongly Disagree (SD) and Disagree (D), respectively) indicate a negative perception; the answers in levels 4 and 5 (Agree (A) and Strongly Agree (SA), respectively) indicate a positive perception; and the answers in level 3 (N) indicate neutrality or indecision.

The results of the frequency analysis of teachers' answers (Table 2) show that most teachers positively evaluated the quality of information (48.5%), perceived ease of use (57.2%), perceived usefulness (53.8%), user satisfaction (65.2%) and intention to continue using (78.8%).

Table 2: Frequency and Percentage of Teachers' Answers.

Item	SD	D	N	A	SA	Mean	Median	Mode
QI1	6 (13,6%)	8 (18,2%)	7 (15,9%)	19 (43,2%)	4 (9,1%)	3,16	4	4
QI2	7 (15,9%)	9 (20,5%)	9 (20,5%)	16 (36,4%)	3 (6,8%)	2,98	3	4
QI3	1 (2,3%)	5 (11,4%)	9 (20,5%)	24 (54,5%)	5 (11,4%)	3,61	4	4
QI4	0 (0,0%)	6 (13,6%)	10 (22,7%)	25 (56,8%)	3 (6,8%)	3,57	4	4
QI5	2 (4,5%)	12 (27,3%)	15 (34,1%)	12 (27,3%)	3 (6,8%)	3,05	3	3
QI6	1 (2,3%)	15 (34,1%)	14 (31,8%)	12 (27,3%)	2 (4,5%)	2,98	3	2
QI	**17 (6,4%)**	**55 (20,8%)**	**64 (24,2%)**	**108 (40,9%)**	**20 (7,6%)**	**-**	**-**	**-**
PEOU1	1 (2,3%)	10 (22,7%)	3 (6,8%)	18 (40,9%)	12 (27,3%)	3,68	4	4
PEOU2	1 (2,3%)	15 (34,1%)	10 (22,7%)	12 (27,3%)	6 (13,6%)	3,16	3	2
PEOU3	1 (2,3%)	5 (11,4%)	11 (25,0%)	22 (50,0%)	5 (11,4%)	3,57	4	4
PEOU4	1 (2,3%)	9 (20,5%)	11 (25,0%)	19 (43,2%)	4 (9,1%)	3,36	4	4
PEOU5	0 (0,0%)	11 (25,0%)	9 (20,5%)	15 (34,1%)	9 (20,5%)	3,50	4	4
PEOU6	1 (2,3%)	9 (20,5%)	5 (11,4%)	24 (54,5%)	5 (11,4%)	3,52	4	4
PEOU	**5 (1,9%)**	**59 (22,3%)**	**49 (18,6%)**	**110 (41,7%)**	**41 (15,5%)**	**-**	**-**	**-**
PU1	4 (9,1%)	9 (20,5%)	10 (22,7%)	17 (38,6%)	4 (9,1%)	3,18	3	4
PU2	4 (9,1%)	6 (13,6%)	10 (22,7%)	18 (40,9%)	6 (13,6%)	3,36	4	4
PU3	5 (11,4%)	7 (15,9%)	9 (20,5%)	18 (40,9%)	5 (11,4%)	3,25	4	4
PU4	4 (9,1%)	6 (13,6%)	15 (34,1%)	14 (31,8%)	5 (11,4%)	3,23	3	3
PU5	3 (6,8%)	12 (27,3%)	10 (22,7%)	14 (31,8%)	5 (11,4%)	3,14	3	4
PU6	1 (2,3%)	3 (6,8%)	4 (9,1%)	26 (59,1%)	10 (22,7%)	3,93	4	4
PU	**21 (8,0%)**	**43 (16,3%)**	**58 (22,0%)**	**107 (40,5%)**	**35 (13,3%)**	**-**	**-**	**-**
US1	3 (6,8%)	4 (9,1%)	3 (6,8%)	31 (70,5%)	3 (6,8%)	3,61	4	4
US2	2 (4,5%)	8 (18,2%)	7 (15,9%)	21 (47,7%)	6 (13,6%)	3,48	4	4
US3	4 (9,1%)	11 (25,0%)	4 (9,1%)	22 (50,0%)	3 (6,8%)	3,20	4	4
US	**9 (6,8%)**	**23 (17,4%)**	**14 (10,6%)**	**74 (56,1%)**	**12 (9,1%)**	**-**	**-**	**-**
BI1	1 (2,3%)	3 (6,8%)	4 (9,1%)	26 (59,1%)	10 (22,7%)	3,93	4	4
BI2	0 (0,0%)	1 (2,3%)	10 (22,7%)	22 (50,0%)	11 (25,0%)	3,98	4	4
BI3	0 (0,0%)	5 (11,4%)	4 (9,1%)	22 (50,0%)	13 (29,5%)	3,98	4	4
BI	**1 (0,8%)**	**9 (6,8%)**	**18 (13,6%)**	**70 (53,0%)**	**34 (25,8%)**	**-**	**-**	**-**

Notes: Quality of Information (QI); Perceived Ease Of Use (PEOU); Perceived Usefulness (PU); User Satisfaction (US); Behavioral Intention to use (BI). Strongly Disagree (SD); Disagree (D); Neutral or Uncertain (N); Agree (A); Strongly Agree (SA).

In addition, most of the items that make up each of the variables have a mean, median and mode above 3, which also indicates a positive perception. Despite having the same mean (2.98, below 3, thus corresponding to a negative perception), items QI2 and QI6 have different modes, revelling different perceptions. Analysing each item individually, we observed that the item QI2 has a mean of 2.98, however, a mode of 4, which reveals a positive perception of most teachers regarding the ease of navigation through Moodle.

Item QI6 has a mean of 2.98 and a mode of 2, which indicates a negative perception of most teachers about Moodle to offer information that is easy to be understood. Item PEOU2 (I find it easy for Moodle to do what I want it to do), despite having a mean of 3.16, has a mode of 2, which shows that most teachers had a negative perception about this item.

The items PU6 and BI1 had proportionally the highest level of agreement (81.8%) from the teachers, followed by BI3 (79.5%), US1 (77.3%) and BI2 (75%). QI5 and PU4 obtained the highest number of neutral or undecided answers (34.1%). QI2, QI6 and PEOU2 had the highest discordant answers (36.4%), followed by US3 and PU5 (34.1%).

Similarly, the results of the frequency analysis of student responses (Table 3) indicate that most students also positively evaluated the items related to information quality (48.8%), perceived ease of use (66.3%), perceived usefulness (63.2%), user satisfaction (59.4) and intention to continue using (57.7%). All items that make up each of the variables had a mean, median and mode above 3.

Table 3: Frequency and Percentage of Students' Answers.

Item	SD	D	N	A	SA	Mean	Median	Mode
QI1	8 (8%)	16 (16%)	39 (39%)	30 (30%)	7 (7%)	3,12	3	3
QI2	8 (8%)	14 (14%)	34 (34%)	28 (28%)	16 (16%)	3,30	3	3
QI3	3 (3%)	12 (12%)	26 (26%)	42 (42%)	17 (17%)	3,58	4	4
QI4	5 (5%)	6 (6%)	30 (30%)	41 (41%)	18 (18%)	3,61	4	4
QI5	5 (5%)	15 (15%)	32 (32%)	36 (36%)	12 (12%)	3,35	3	4
QI6	5 (5%)	13 (13%)	36 (36%)	32 (32%)	14 (14%)	3,37	3	3
QI	**34 (5,7%)**	**76 (12,7%)**	**197 (32,8%)**	**209 (34,8%)**	**84 (14,0%)**	**-**	**-**	**-**
PEOU1	0 (0%)	6 (6%)	10 (10%)	61 (61%)	23 (23%)	4,01	4	4
PEOU2	1 (1%)	7 (7%)	23 (23%)	54 (54%)	15 (15%)	3,75	4	4
PEOU3	2 (2%)	18 (18%)	31 (31%)	41 (41%)	8 (8%)	3,35	3	4
PEOU4	1 (1%)	9 (9%)	26 (26%)	52 (52%)	12 (12%)	3,65	4	4
PEOU5	3 (3%)	12 (12%)	23 (23%)	56 (56%)	6 (6%)	3,50	4	4
PEOU6	2 (2%)	9 (9%)	19 (19%)	53 (53%)	17 (17%)	3,74	4	4
PEOU	**9 (1,5%)**	**61 (10,2%)**	**132 (22,0%)**	**317 (52,8%)**	**81 (13,5%)**	**-**	**-**	**-**
PU1	2 (2%)	5 (5%)	20 (20%)	59 (59%)	14 (14%)	3,78	4	4
PU2	2 (2%)	10 (10%)	27 (27%)	50 (50%)	11 (11%)	3,58	4	4
PU3	2 (2%)	15 (15%)	34 (34%)	39 (39%)	10 (10%)	3,40	3	4
PU4	5 (5%)	12 (12%)	41 (41%)	33 (33%)	9 (9%)	3,29	3	3
PU5	3 (3%)	4 (4%)	11 (11%)	62 (62%)	20 (20%)	3,92	4	4
PU6	2 (2%)	7 (7%)	19 (19%)	55 (55%)	17 (17%)	3,78	4	4
PU	**16 (2,7%)**	**53 (8,8%)**	**152 (25,3%)**	**298 (49,7%)**	**81 (13,5%)**	**-**	**-**	**-**
US1	3 (3%)	9 (9%)	33 (33%)	49 (49%)	6 (6%)	3,46	4	4
US2	4 (4%)	12 (12%)	25 (25%)	50 (50%)	9 (9%)	3,48	4	4
US3	3 (3%)	13 (13%)	20 (20%)	56 (56%)	8 (8%)	3,53	4	4
US	**10 (3,3%)**	**34 (11,3%)**	**78 (26,0%)**	**155 (51,7%)**	**23 (7,7%)**	**-**	**-**	**-**
BI1	2 (2%)	11 (11%)	19 (19%)	59 (59%)	9 (9%)	3,62	4	4
BI2	2 (2%)	16 (16%)	30 (30%)	45 (45%)	7 (7%)	3,39	4	4
BI3	3 (3%)	13 (13%)	31 (31%)	43 (43%)	10 (10%)	3,44	4	4
BI	**7 (2,3%)**	**40 (13,3%)**	**80 (26,7%)**	**147 (49,0%)**	**26 (8,7%)**	**-**	**-**	**-**

Notes: Quality of Information (QI); Perceived Ease Of Use (PEOU); Perceived Usefulness (PU); User Satisfaction (US); Behavioral Intention to use (BI). Strongly Disagree (SD); Disagree (D); Neutral or Uncertain (N); Agree (A); Strongly Agree (SA).

The item PEOU1 presented proportionally the highest number of agreeing to answers (84%) among the students, followed by PU5 (82%) and PU1 (73%). The statement PU4 had the highest number of neutral or undecided answers (41%). QI1 and QI2 had the highest number of answers with disagreements (24% and 22%, respectively).

5 DISCUSSION

The results of the frequency analysis, performed with IBM SPSS Statistics, showed that although only 2.3% of the teachers considered that they had insufficient mastery in the use of ICT, most of the activities and resources in Moodle are never or rarely used. The results indicated that assignment and quiz were the most used activities. This finding confirms the results of Badia et al. (2019). In contrast, the study of Batista (2016) showed that forum is the most used activity, followed by assignment, with quiz appearing only in the third position. Regarding resources, our results showed that file and URL are the most used ones, partially contrasting with the findings of Badia et al. (2019). As seen, the findings do not follow a uniformity, which may indicate that the choice of which resource to use may be associated with the type of course, the profile of the teacher, the objectives of the curricular unit and the domain of the teacher with respect to the use of the resources provided by Moodle.

The frequency analysis of the participants' answers showed that, in general, the PEOU variable stood out as the best evaluated by students, followed by PU, US and BI. Regarding the teaching staff, the items referring to the BI variable had the most positive evaluations, followed by US, PEOU and PU. These results show a positive perception of students and teachers regarding the ease of use and usefulness of Moodle, besides demonstrating that users are satisfied and intend to continue using Moodle, supporting the findings of previous studies (Carvalho Neto, 2009; Chiu et al., 2005; Pereira et al., 2015). However, despite also having a positive assessment, the QI variable had the worst performance compared to the other variables due to many neutral/uncertain answers. This result may indicate that the statements were not clear enough and thus generated doubts in the participants, which suggests that an improvement for these items should be considered.

6 CONCLUSION

In addition to contributing to the formation of knowledge about the perception of students and teachers about the factors that influence the satisfaction and intention to continue using Moodle as VLE to support classroom teaching in undergraduate courses in IFRO - Campus Vilhena, this study also allowed participants to express their opinions about the use of this platform.

The results of the descriptive analysis reflect a positive perception of teachers and students regarding the ease of use and usefulness of Moodle, besides evidencing that users are satisfied and intend to continue using Moodle. Despite this, most activities and resources available in Moodle are never or rarely used by teachers. Thus, the educational institution should define strategies to monitor the specific needs of each teacher and, based on the teaching and learning objectives of each curricular unit, promote training actions to maximise the use of all resources and Moodle activities.

These findings may be useful for researchers and professionals in the area, by providing information that can contribute to the management and incremental improvement of the use of Moodle, as support for classroom teaching. Besides providing subsidies for the planning of pedagogical actions, contributing to the improvement of the teaching and learning process.

Furthermore, institutions should conduct periodic surveys with users to identify problems and limitations and thus seek continuous improvement in Moodle use. Thus, this research is expected to be a driver for further research aimed at analysing users' perceptions regarding the use of Moodle in the institution.

Although the results are encouraging and helpful, the present study, like any research, has its limitations that require future research.

The sample studied is limited to students and teachers of undergraduate courses of only one public educational institution, so the results cannot be generalised. Thus, we suggest that future research study and compare larger populations from different levels of education (primary, secondary, technical, undergraduate and post-graduate) of public and private institutions.

The fact that this study was conducted in a period of remote classes due to the Covid-19 pandemic should also be considered, as this condition may have affected the participants' perceptions. Furthermore, responses to this study were voluntary and, therefore, inevitably subject to self-selection variance.

Finally, the participants' responses represent cross-sectional data, i.e., measuring users' perceptions at a single point in time. Hence, perceptions may change with increasing user experience over time. Thus, additional longitudinal studies are recommended.

The study of the linear causal relationships among the latent variables of the model obtained from the integration of TAM and IS Success Models, through the use of Structural Equation Modeling analysis, is also planned to be implemented in the near future.

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REFERENCES

Al-Fraihat, D., Joy, M., Masa'deh, R., & Sinclair, J. (2020). Evaluating E-learning systems success: An empirical study. *Computers in Human Behavior*, *102*, 67–86. https://doi.org/10.1016/j.chb.2019.08.004

Badia, A., Martín, D., & Gómez, M. (2019). Teachers' Perceptions of the Use of Moodle Activities and Their Learning Impact in Secondary Education. *Technology, Knowledge and Learning*, *24*(3), 483–499. https://doi.org/10.1007/s10758-018-9354-3

Batista, S. A. D. da S. (2016). *Fatores determinantes na adoção e uso continuado da plataforma Moodle numa instituição de ensino superior* [Dissertação (Mestrado em Educação), Universidade de Lisboa]. https://repositorio.ul.pt/handle/10451/22686

Bedregal-Alpaca, N., Cornejo-Aparicio, V., Tupacyupanqui-Jaén, D., Flores-Silva, S., Bedregal-Alpaca, N., Cornejo-Aparicio, V., Tupacyupanqui-Jaén, D., & Flores-Silva, S. (2019). Evaluación de la percepción estudiantil en relación al uso de la plataforma Moodle desde la perspectiva del TAM. *Ingeniare. Revista Chilena de Ingeniería*, *27*(4), 707–718. https://doi.org/10.4067/S0718-33052019000400707

Cardoso, G. D. S. (2016). *O ambiente virtual de ensino e aprendizagem: Aplicação da plataforma Moodle no ensino presencial*. 95.

Carvalho Neto, S. (2009). *Dimensões de qualidade em ambientes virtuais de aprendizagem* [Tese (Doutorado em Administração), Universidade de São Paulo - USP]. https://doi.org/10.11606/T.12.2009.tde-02022010-123846

Chiu, C.-M., Hsu, M.-H., Sun, S.-Y., Lin, T.-C., & Sun, P.-C. (2005). Usability, quality, value and e-learning continuance decisions. *Computers & Education*, *45*(4), 399–416. https://doi.org/10.1016/j.compedu.2004.06.001

Cidral, W. A., Oliveira, T., Di Felice, M., & Aparicio, M. (2018). E-learning success determinants: Brazilian empirical study. *Computers & Education*, *122*, 273–290. https://doi.org/10.1016/j.compedu.2017.12.001

Costa, C., Alvelos, H., & Teixeira, L. (2017). Acceptance of Moodle by professors: A study in a Portuguese Higher Education Institution. *Atas Da Conferência Da Associação Portuguesa de Sistemas de Informação*, *16*(16), 278-285–285. https://doi.org/10.18803/capsi.v16.278-285

Dağhan, G., & Akkoyunlu, B. (2016). Modeling the continuance usage intention of online learning environments. *Computers in Human Behavior*, *60*, 198–211. https://doi.org/10.1016/j.chb.2016.02.066

Davis, F. D. (1989). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *MIS Quarterly*, *13*(3), 319–340. https://doi.org/10.2307/249008

Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User Acceptance of Computer Technology: A Comparison of Two Theoretical Models. *Management Science*, *35*(8), 982–1003.

DeLone, W. H., & McLean, E. R. (1992). Information Systems Success: The Quest for the Dependent Variable. *Information Systems Research*, *3*(1), 60–95. https://doi.org/10.1287/isre.3.1.60

DeLone, W. H., & McLean, E. R. (2003). The DeLone and McLean Model of Information Systems Success: A Ten-Year Update. *Journal of Management Information Systems*, *19*(4), 9–30. https://doi.org/10.1080/07421222.2003.11045748

Kothari, C. R. (2004). *Research Methodology: Methods and Techniques.* New Age International Pvt. Ltd., Publishers.

Moodle. (2020). *Moodle*. Moodle. https://moodle.com/pt/

Pereira, F. A. de M., Ramos, A. S. M., & das Chagas, M. M. (2015). Satisfação e continuidade de uso em um ambiente virtual de aprendizagem. *REGE - Revista de Gestão*, *22*(1), 133–153. https://doi.org/10.5700/rege555

Prodanov, C. C. (2013). *Metodologia do trabalho científico: Métodos e Técnicas da Pesquisa e do Trabalho Acadêmico* (2nd ed.). FEEVALE.

Roca, J. C., Chiu, C.-M., & Martínez, F. J. (2006). Understanding e-learning continuance intention: An extension of the Technology Acceptance Model. *International Journal of Human-Computer Studies*, *64*(8), 683–696. https://doi.org/10.1016/j.ijhcs.2006.01.003

Rodrigues, S. M. (2020). A Utilização de Recursos e Atividades do Moodle por Parte de Docentes do Ensino Superior Politécnico: Progresso ou Estagnação? - Estudo de caso. *Revista Ibérica de Sistemas e Tecnologias de Informação*, *E31*, 480–496.

Sebastião, A. P. F. (2015). A utilização do ambiente virtual de aprendizagem Moodle em uma instituição de ensino superior pública. *Revista Profissão Docente*, *15*(32), 131–139. https://doi.org/10.31496/rpd.v15i32.838

Sobreira, L. (2013, March 6). *Vivências de Alunos e Professores no Uso da Plataforma Moodle como*

Complemento às Aulas Presenciais de Química para o 1º Ano do Ensino Médio: Um Estudo de Caso [MasterThesis]. http://dspace.uevora.pt/rdpc/handle/10174/11157

Šumak, B., Heričko, M., & Pušnik, M. (2011). A meta-analysis of e-learning technology acceptance: The role of user types and e-learning technology types. *Computers in Human Behavior*, *27*(6), 2067–2077. https://doi.org/10.1016/j.chb.2011.08.005

UBC Computer Scientist Wins $100,000 Award for Popular Course Software. (2004, September 27). UBC News. https://news.ubc.ca/2004/09/27/archive-media-releases-2004-mr-04-103/

Venkatesh, V., & Davis, F. D. (2000). A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies. *Management Science*, *46*(2), 186–204. https://doi.org/10.1287/mnsc.46.2.186.11926

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User Acceptance of Information Technology: Toward a Unified View. *MIS Quarterly*, *27*(3), 425–478. JSTOR. https://doi.org/10.2307/30036540

Wang, H. C., & Chiu, Y. F. (2011). Assessing e-learning 2.0 system success. *Computers & Education*, *57*(2), 1790–1800. https://doi.org/10.1016/j.compedu.2011.03.009

APPENDIX

Survey Items

Code	Statement	Adapted from
Perceived Ease Of Use (PEOU)		
PEOU1	Learning to use Moodle is easy for me.	(Davis, 1989; Roca et al., 2006)
PEOU2	I find it easy for Moodle to do what I want it to do.	(Davis, 1989)
PEOU3	My interaction with Moodle is clear and understandable.	(Davis, 1989; Roca et al., 2006)
PEOU4	I find interacting with Moodle flexible	(Davis, 1989)
PEOU5	It is easy for me to become skilled in using Moodle.	(Davis, 1989; Roca et al., 2006)
PEOU6	Overall, I find Moodle easy to use.	(Davis, 1989; DeLone & McLean, 2003)
Perceived Usefulness (PU)		
PU1	Using Moodle allows me to get tasks done more quickly.	(Davis, 1989; Venkatesh & Davis, 2000)
PU2	Using Moodle improves my performance at work. (Teachers) Using Moodle improves my academic performance. (Students)	(Davis, 1989; Roca et al., 2006)
PU3	Using Moodle increases my productivity.	(Davis, 1989)
PU4	Use of Moodle increases my effectiveness at work. (Teachers) Using Moodle increases my learning effectiveness. (Students)	(Davis, 1989; Roca et al., 2006)
PU5	The use of Moodle facilitates my work. (Teachers) Using Moodle, it is easier to follow and study the course material. (Students)	(Davis, 1989)
PU6	Overall, I find Moodle useful for my work. (Teachers) Overall, I find Moodle useful for my learning. (Students)	(Davis, 1989; Roca et al., 2006)
Quality of Information (QI)		
QI1	Moodle's layout and user interface are user friendly.	
QI2	Moodle is easy to navigate around.	
QI3	Moodle offers the resources I need.	(Chiu et al., 2005; Pereira et al., 2015)
QI4	I feel comfortable using the resources offered by Moodle.	
QI5	Moodle offers comprehensive information.	
QI6	Moodle offers information that is easy to understand.	
User Satisfaction (US)		
US1	I am satisfied with the experience of using Moodle.	(Chiu et al., 2005; Dağhan & Akkoyunlu, 2016)
US2	I am satisfied with Moodle's performance.	(Al-Fraihat et al., 2020; Chiu et al., 2005; Dağhan & Akkoyunlu, 2016)
US3	Moodle meets my educational needs.	(Al-Fraihat et al., 2020)
Behavioral intention to use (BI)		
BI1	I intend to continue using Moodle frequently. (Teachers) I intend to use Moodle in my studies often. (Students)	
BI2	I anticipate that I will continue to use Moodle in my daily life. (Teachers) I anticipate that I will use Moodle in my day to day studies. (Students)	(Chiu et al., 2005; Venkatesh et al., 2003)

Code	Statement	Adapted from
BI3	I have plans to continue using Moodle in the future. (Teachers) I have plans to use Moodle in my studies in the future. (Students)	