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RESEARCH ARTICLE

Students Perceptions of E-Assessment at the Algerian University in Light of Some Demographic Variables

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Abstract

The expansion of an e-learning application, especially after the coronavirus crisis, encouraged Algerian teachers to replace the traditional assessment with online electronic assessment, which can be described as the process of using modern technology and the Internet to collect and analyze students' data and responses. This study aims to provide a report on the perceptions of Algerian university students toward e-assessment. The exploratory-type quantitative methodology was used. It is commonly used when the goal is to investigate the opinions or attitudes of large groups of participants. The student's perception of e-assessment questionnaires was made in Google Forms to collect responses from a sample of (385) male and female students registered in several disciplines. The survey examined seven areas: (1) awareness, (2) perceived usefulness, (3) perceived ease of use, (4) compatibility, (5) self-efficacy, (6) resource facilitation, and (7) information technology assistance. Descriptive analysis will be performed using descriptive statistics and inferential statistics in the form of a *t*-test using Statistical Package for the Social Sciences software, taking into account variables such as gender, level of study, and specialization. Finally, by exploring the opinion of the students, recommendations will be suggested to improve the e-assessment at the university.

Keywords: Algerian university, demographic variables, e-assessment, students' perceptions

Introduction

Since the pandemic [coronavirus disease 2019 (Covid-19)], the learning system in the world of education has undergone very significant changes. Algeria is no exception. The government has overtly decided to use technology so that the process of teaching and learning continues. The beginning of 2020 is the start for all aspects of teaching at Algerian universities to adopt the distance (online) and hybrid-teaching model, due to the emergence of the epidemic of coronavirus. The learning process of the study program is carried out using Information and Communication Technology (ICT). Moodle as a Learning Platform or course management system was chosen as the official technical means to support teachers and students (Koneru, 2017). There are also other applications used to facilitate the online learning process including Zoom, Google Meet, Google Classroom, Schoology, Teem, etc. After the pandemic, many teachers have continued to teach their courses in hybrid mode, to use the best of face-to-face and online learning, and to even run electronic assessments for their students (Singh et al., 2021).

The presence of Internet technology, which allows people to interact more easily without being limited by space and time, has pushed the education sector into a new era of online learning use. Thanks to e-learning or online learning, the learning process can take place whenever and wherever you want. The advantages of implementing e-learning are flexibility of space and time, the ability to do it independently, increased ability to use technology, and easy access to communication (Anderson et al., 2005; Blizak et al., 2020; Koşar, 2021). Barriers to applying e-learning are unstable network connections, increased costs, less efficient learning, and too many tasks (Amiti, 2020).

The transition from face-to-face teaching to an online environment has a serious impact on assessment and evaluation. Teachers should change the type of assessment to suit the online mode. They need to assess learners so that they can make a judgment on their learning. For this, they use tests in different forms depending on the objectives and pre-set cognitive level that help increase the learners' success skills.

Assessment is one of the main components of the learning process, which is a strategic part to determine the accuracy of learning outcomes (Ulucan & Öngören, 2021). The purpose of the assessment is to determine the level of achievement of learning objectives and to see the effectiveness of the learning process. It is a systematic process of collecting, analyzing, and interpreting information to determine students' level of achievement against learning goals (Schneider & Randel, 2010). The types of assessments are not only scoring tools indicating the achievement of students' learning goals, but they are also learning tools (Alkharusi, 2010). The educational assessment is an organized process of collecting and analyzing data and information to determine the extent to which learners' learning outcomes have been achieved and to make appropriate decisions in this regard (Aygun & Aydın,2016; Amiti, 2020).

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Before the Covid-19 pandemic, all universities in Algeria used the pen-and-paper exam to assess students. But the health protocol's social distancing requirements have compelled teachers to adopt electronic assessment as maintained by Kurniawan et al. (2019). This type of assessment, according to them, is where digital technologies are used to create, disseminate, assess, and provide feedback for diagnostic, formative, summative, or self-evaluation. It is one of the important components of the curriculum, and it is defined as the process of employing information networks, computer equipment, educational software, and multi-source educational material by analyzing students' responses. While Nizet et al. (2016) define the online learning assessment situation as any assessment situation where the assessment process is carried out while the student and the teacher or trainer are not physically present in the same place, which justifies the use of digital technology.

According to the submission methods (Amiti, 2020), e-assessment models are classified into two types:

- Asynchronous e-assessment:

It is an assessment that does not require the presence of learners at the same time and in the same place, and it is carried out using computer techniques (hardware and software), without the need to connect to local networks or the Internet.

- Synchronous e-assessment:

This is an assessment of learning by an electronic medium at a specific time, either by an individual or group method, and this assessment is online based on the Internet for the submission of the test. For this study, we consider e-assessments to be any means of evaluating the student's learning and achievement in synchronous or asynchronous online processes. For this broader meaning, we prefer to use the term e-assessment which has instead of the terms online assessment, online evaluation, online test, or remote assessment that other researchers prefer to use.

Liang & Creasy (2004) distinguish five types of online e-assessment: tests and exams (e.g., module quizzes or exams), written assignments (e.g., reaction paper or evaluate instructional software), proficiency demonstrations (e.g., electronic portfolio or create slide show), collaboration (e.g., group research project or peer reflection), and participation (e.g., questions and answers posted).

Stowell & Bennett (2010) conducted a study of 69 participants in a psychology course to learn about the impact of online exams on exam performance and exam anxiety. He found that students who generally experienced high levels of classroom exam anxiety were reduced by taking online exams for exam anxiety, while the opposite was true for those with low-class exam anxiety. In addition, they showed in their study that the relationship between test anxiety and exam performance was weaker in an online environment than in the classroom.

Technological development has led to the emergence of many programs for designing and building tools for e-assessment. Among these programs are the following: Maker quiz, Builder Quiz, Maker Test, test fast program, V professional test fast, Quiz Creator, and so on. E-assessment tools differ from one software to another, as there is software that can allow the design and construction of various forms of assessment tools such as questionnaires and electronic tests (Sulak, 2022). One of the most important things that help teachers in the e-assessment process and allow students to respond quickly electronically is electronic applications, such as One Note, cloud storage such as Google Drive—OneDrive—Dropbox, Google Forms—Class Maker—Edmodo, and Qorrec système.

Kılınç et al. (2021) declared that learning management systems such as Blackboard, Canvas, and Moodle are generally the most widely used for performing online assessment tests, whether formative or summative. For them, question types such as multiple choice, true-false, short-long answer, gap-filling, and matching have positive effects on learners, teachers, and institutions.

The assessment methods used by teachers to assess students are one of the most important factors that can directly or indirectly affect student learning motivation (Alkharusi, 2010). Aygun & Aydın (2016) claim that electronic assessment can increase students' learning motivation. It is therefore evident that assessment is one of the most important factors that can affect learner motivation and learning. In addition, the teacher's role in the planning, management, and proper execution of assessment activities should be a priority.

In addition, the assessment medium or the assessment format used also has a great influence on the learning outcomes of students. According to several studies (Ayyoub & Jabali, 2021; Kılınçet al., 2021; Anderson et al., 2005; Alruwais et al., 2018), online testing has its advantages and limitations, which were summarized in Table 1.

Some researchers (Alruwais et al., 2018; Jordan, 2013) have suggested solutions to overcome the difficulties of e-assessment:

- Initial training of students to familiarize themselves with electronic assessment.
- Facilitate student access to computers and the Internet by providing fully equipped classrooms with Internet access.
- Train teachers to be more confident in using the electronic assessment system.

Cheating in the light of online learning is one of the biggest challenges facing educational institutions, especially after the transition from face-to-face to distance education in light of the pandemic of coronavirus. Regarding this problem during online tests, Watson & Sottile (2010) found that cheating in online tests is not more prevalent than cheating in face-to-face courses. To remedy this, some suggest that students must be on campus to take the exam in person at a set date and time. Khan & Balasubramanian (2012) found that 224 undergraduate students from different universities in UAE surveyed admitted to using a variety of devices to electronically cheat, including smartphones, calculators, and USB drives.

However, Kapardis & Spanoudis (2021) have shown in their study that e-examination cheating can be reduced if, before the exam, students are made to reinforce their academic integrity.

Students' perceptions of assessment have a significant impact on the quality of their learning and their academic success (Alkharusi, 2010).

Table 1.
Advantages and Limitations of E-assessment

Advantages	**Limitations**
• Cost and time savings • Allows the use of multimedia (text, audio, video, and images) • Storage of answers • Providing appropriate • Feedback instantly. • Ensuring flexibility • High security by reducing human errors • Less effect of the instructor • Obtaining quick results • Allows the use of multimedia elements • Easier to replicate • Easier to administer • Reduce the intensity of test anxiety in learners.	• Requiring computer and internet access, • The possibility of students cheating • The difficult control of whether the student himself or herself takes the exam • Difficult communication • Laboratory tests, practical worked performance tests are not possible online • Evaluating group work is hard work

Jaffar et al. (2020) in their study, which uses canonical analysis to correlate learning approaches and students' perception of the assessment task at the higher education level, showed two opposing attitudes with regard to students' perception of assessment. According to them, students who have a positive understanding of assessment use deep learning strategies, while students who have a negative perception of homework assessment use superficial learning strategies leading to low cognitive activity.

Elsalem et al. (2020) have shown that around one-third of students from the Faculties of Medical Sciences at Jordan University of Science and Technology reported stress with remote e-exams, which was found to be associated with academic major and gender. However, it has been proven that students' fear of technological failure dissipates after a few successful online exams (Hillier et al., 2020).

According to many studies (Alkharusi, 2010; Al-Momani, 2021; Kundu & Bej, 2021), gender, subject, level of education, nature of the stream of study, and economic conditions are among the factors that can affect students' perception of e-assessment.

Patronis et al. (2019) in their studies on Zayed University (UAE) students' perceptions of the benefits and challenges of summative e-assessment showed that students prefer pen-and-paper exams to e-assessment in summative writing exams. Their preference was due to the many challenges associated with using an e-assessment for free-text responses, which were related to the need for extra time to complete the exam, lack of directions, lack of technological skills, the length of the exam, and the features of an e-assessment, including the size of the screen display and the built-in timer. But, it has been established that students favored multiple-choice questions (Furnham et al., 2011).

In addition, almost half of the undergraduate students of the University of South Africa (UNISA) in the study sample (N=159) of Van Heerden & Goosen (2021) strongly agreed that online assessment improves self-learning. In addition, they valued the features of online assessment providing faculty with feedback to improve the quality of assessment in higher education. However, the largest groups of participants neither agree nor disagree that the online assessment did not facilitate cheating. Concerning both online assessment and cheating, the largest groups of participants remain neutral, as they neither agree nor disagree on such concerns.

Due to the sanitary distancing caused by Covid-19, all Algerian universities had converged on online learning for some subjects and blended for others. Therefore, it is important to examine students' perceptions of the e-assessment mode online used by teachers. Students' perceptions of the use of e-assessment in Algerian universities have not been studied before. Therefore, this exploratory study aims to fill the current deficit to some extent in this field by investigating the perceptions and opinions of higher education students toward e-assessment at the Algerian university. In this regard, the problem of the study is determined by the following two research questions:

Q1. What are the students' perceptions of e-assessment in Algerian universities?
Q2. Are there statistically significant differences between the responses of sample individuals to the study tool due to each of the variables: gender, age, region, field of study, and educational level?

Method

In this study, we have followed the qualitative and descriptive approach due to its suitability to the nature of the research and to achieve its objectives. In this case, the questionnaire is one of the most common data collection methods. To answer the research questions of this study, appropriate statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS-19) statistical program, where the means, frequencies, and standard deviations (SDs) were calculated, and differences between means were used according to *t*-tests and one-way analysis of variance (ANOVA) tests in terms of the study variables.

Research Tool

There are many tests and questionnaires in the literature related to e-assessment. Since most of the themes are validated and verified, we opted for the students' perception of the e-assessment questionnaire (SPEAQ) used by Kundu Arnab and Tripti Bej (2021). The items of this questionnaire cover all important factors as proposed in the model of acceptance and usage of e-assessment developed by Sadaf et al. (2012) (cited in Kundu and Bej, 2021).

Once the main authors had agreed to our use of their questionnaire, we translated it into Arabic and adapted it to the Algerian context to make sure that all students could understand the questionnaire items. Instead of 40 question items of SPEAQ in the Indian version, the Algerian version contained 35 divided into 2 main factors: attitude and perceived behavioral control. It consists of seven statements relating to awareness (i.e., I am well acquainted with e-assessment), perceived usefulness (i.e., I feel online exams are fairer than paper-pen exams and free from human errors), perceived ease of use (i.e., I feel stress using a computer during examinations), compatibility (i.e., online exams are easy to assess, time-saving, and easy to evaluate), self-efficacy (i.e., I believe e-assessments can do things quickly that paper-based assessments cannot), resource facilitation (i.e., I feel technical problems make online exams impractical), and information technology (IT) support (i.e., I have a computer for personal use at my home) for students toward e-assessment. A 5-point Likert scale was chosen to measure the degree of adherence to the proposed statements. The students have to choose between five possible answers (strongly disagree, disagree, agree, and strongly agree), which are evaluated according to the order of 1 to 5. Higher scores indicate a better and positive perception toward e-assessment.

Three experts in science education have revised the SPEAQ and corrected some items to be more adapted to the Algerian context. The SPEAQ also includes questions regarding individual sociodemographic factors. We used them to investigate possible correlations between these factors and students' perceptions of e-assessment. These indicators are gender (male and female), age, field, and academic level. The general internal consistency of the SPEAQ was found to be very satisfactory (Cronbach's α=.88). Also, the sub-factor-wise internal consistencies have been compared with the Indian version (see Table 2). They are as acceptable as those found by Kundu & Bej (2021).

Table 2.
Cronbach's Alpha Coefficient Values for SPEAQ Factors

Factors	Sub-Factors	Number of Items	Cronbach's α (This Study)	Cronbach's α (Kundu & Bej, 2021)
Attitude	Awareness	5 items	.89	.86
	Perceived usefulness	5 items	.81	.85
	Perceived ease of use	5 items	.80	.78
	Compatibility	5 items	.78	.92
Perceived behavioral control	Self-efficacy	5 items	.83	.88
	Facilitation resource	5 items	.80	.91
	IT support	5 items	.75	.89
Overall questionnaire		35 items	.88	.95

Note: IT=information technology; SPEAQ=students' perception of the e-assessment questionnaire.

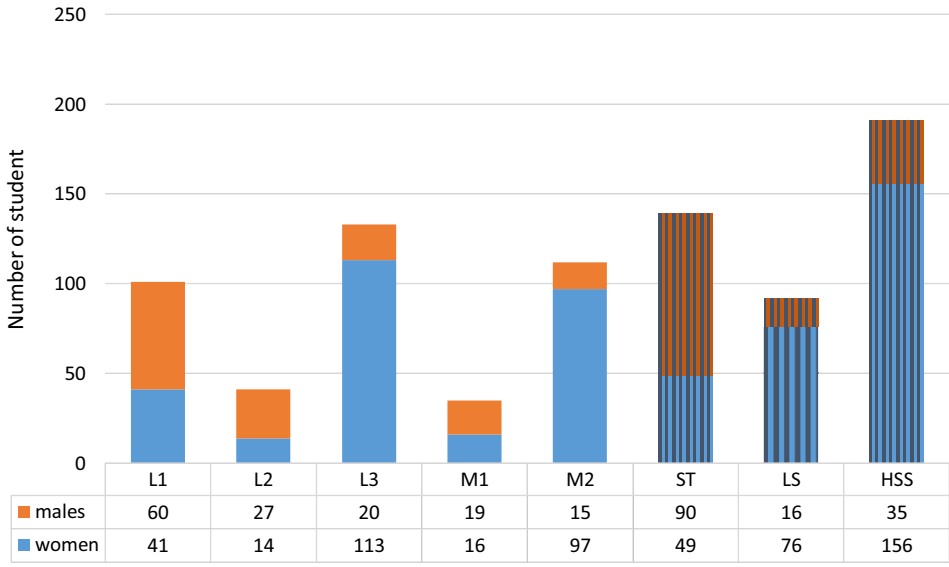

Figure 1.
Distribution of the Study Sample According to the Variables Genre and Academic Level.

Table 3.
The Five Categorization of Students' Perception Level

Mean Score	**1–1.8**	**1.81–2.6**	**2.61–3.4**	**3.41–4.2**	**4.21–5**
Level	Highly negative	Negative	Moderate	Positive	Highly positive

Sample and Procedure

The SPEAQ was made in Google Forms to collect responses from a random sampling of 422 students. They are registered in 19 universities located in the center, east, and west of Algeria in the second semester of the academic year 2021–2022. The age of the students in our sample was between 17 and 29 years old with an average of 21.97 (SD = 2.75) years. Of these students, 66.4% are females, and 60% of them are enrolled in universities located in the center of the country. The academic level of our participants was first-year bachelor (L1), second-year bachelor (L2), third-year bachelor (L3), first-year master (M1), and second-year master (M2). We categorized respondents into three fields of study: technical sciences (TS), life sciences (LS), and humanities and social sciences (HSS). Figure 1 illustrates the heterogeneity of our sample.

To interpret the range scores of the student's responses to the items of the scale, the statistical standard indicated in Table 3 was used, where the length of the category was calculated by the following relation: 5-15=0.8.

Results

Descriptive Statistics of Students' Responses

The descriptive statistics (mean and SD) of the students' responses to the various factors and sub-factors of the SPEAQ scale are presented in Table 4.

We notice that the students of Algerian universities have a moderate overall perception, even though the attitude factor is positive (M = 3.30, SD = 0.44). It is clear from the results that the students were mainly in favor of compatibility, where the average of this domain was (3.64), followed by the domains IT support (3.48), self-efficacy (3.20), resource facilitation (3.20), perceived ease of use (3.20), perceived usefulness (3.20), and finally the awareness domain (3.20).

The SPEAQ items with the lowest scores for each sub-factor are shown in Table 5. The lowest score is for item 3 (e-assessment has been a regular phenomenon in my university) followed by item 33 (I have a computer for personal use at my home).

The statistical *t*-test was calculated for the independent samples as well as the difference between the mean score according to the gender of the students. As shown in Table 6, the mean was estimated at 3.33 for female students, while it was estimated at 3.23 for male students. Note that the "*t*" value was 2.34 and the difference between the means is 0.105. This value is statistically insignificant because it is above the significance level of .05. This confirms that there are no statistically

Table 4.
Descriptive Statistics of Students' Responses to the SPEAQ

Factors	**Sub-Factors**	**Order**	**Mean (M)**	**Standard Deviation (SD)**	**Level**
	Awareness domain	7	2.68	.88	Moderate
	Perceived usefulness domain	6	3.07	.84	Moderate
	Perceives ease to use domain	5	3.34	.74	Moderate
	Compatibility domain	1	3.64	.65	Positive
Attitude			3.18	.52	Moderate
	Self-efficacy domain	3	3.47	.74	Positive
	Resource facilitation domain	4	3.41	.71	Positive
	IT support domain	2	3.48	.64	Positive
Behavior control			3.45	.51	Positive
Overall perception			3.30	.44	Moderate
N (valid)				422	

Note: IT = information technology; SPEAQ = students' perception of the e-assessment questionnaire.

Table 5.
The Item With the Lowest Mean in Each SPEAQ Sub-Factor

Sub-Factor	Number of Items	Item	Mean	SD
Awareness domain	3	E-assessment has been a regular phenomenon in my university.	2.55	.811
Perceived usefulness domain	6	I feel that the online assessment is just as safe as the face-to-face assessment on paper.	2.99	.893
Perceives ease to use domain	13	I fear that e-assessment in my university will ruin my career.	3.23	.975
Compatibility domain	20	Being objective or multiple-choice type, e-assessment is unable to reflect my true level of knowledge.	3.48	.890
Self-efficacy domain	24	I believe by making quick assessment online exams provide help to the overall teaching-learning.	3.42	.926
Resource facilitation	28	I feel there are serious health and safety issues with online exams.	3.21	.976
IT support domain	33	I have a computer for personal use at my home.	2.87	.905

Note: IT = information technology; SPEAQ = students' perception of the e-assessment questionnaire.

Table 6.
Independent Samples Test

	Gender	*N*	Mean	Standard Deviation	*t*	Significance (Two-Tailed)
Mean: overall perception	F	281	3.3348	.44554	2.340	.020
	M	141	3.2300	.40882		

significant differences between the students at the level of gender concerning their perception of the e-assessment.

The one-way ANOVA test was used to verify the statistical significance of the differences between the mean scores of the students on the *SPEAQ scale* according to the academic level and field of study.

The results of the ANOVA test (Table 7) showed a non-statistically significant difference between the mean scores of university students' perception toward e-assessment of different academic levels ($p > .05$). However, a statistically significant difference between students'' mean scores for the field of study ($p < .05$) was detected.

Where it appears that there are differences within and between groups, and to ensure the existence of this difference between the three fields of study (TS, LS, and HSS), we have chosen to use the "Scheffe" test. The results in Table 8 show that the value of the mean difference between TS students and LS students is -0.076 and $p > .05$, which means that there are no statistically significant differences between the two groups toward e-assessment. Similarly, there is also no statistically significant difference between the LS student group and the HSS group (p = .337 > .05). However, we notice that the value of the mean difference between TS students and HSS students is −0.157, with $p < .05$ which means that the differences between the two groups in the perception of e-assessment are statistically significant. This difference is well illustrated in Figure 2.

Table 7.
One-Way ANOVA Comparison Among Students' Perception According to Academic Level and Field of Study

		Sum of Squares	*df*	Mean Square	*F*	Significance
Academic level	Between groups	1.418	4	.354	1.881	.113
	Within groups	78.592	417	.188		
	Total	80.010	421			
Field of study	Between groups	2.005	2	1.003	5.385	.005*
	Within groups	78.005	419	.186		
	Total	80.010	421			

Note: *The mean difference is significant at the .05 level.
ANOVA = analysis of variance.

Table 8.
Multiple Comparisons (Scheffe) to Determine the Influence of Study Field on E-assessment Perception

	Field of Study (I)	Field of Study (J)	Mean Difference (I − J)	Standard Error	Significance
Scheffe	TS	LS	−.07643	.05799	.420
		HSS	−.15726*	.04810	.005
	LS	TS	.07643	.05799	.420
		HSS	−.08083	.05476	.337
	HSS	TS	.15726*	.04810	.005
		LS	.08083	.05476	.337

Note: HSS = humanities and social science; LS = life sciences; TS = technical sciences.
*The mean difference is significant at the .05 level.

Discussion and Conclusion and Recommendations

Regarding the first research question: "What are the students' perceptions about e-assessment in Algerian university?" descriptive statistics revealed that the overall perception of Algerian students toward e-assessment has a moderate trend. Nevertheless, the researchers consider this result acceptable and very close to a positive level because the level of the Behavior control factor was positive. In addition, if the level of attitudes was moderate, it is due to the awareness domain and perceived usefulness domain sub-factors that received the lowest scores. They attribute this result to the fact that students have greatly benefited from the advantage of online learning during the period of the Covid-19 pandemic (Blizak, 2020). Similar results were found in several other countries: India (Kundu & Bej, 2021), Türkiye (Ilgaz & Afacan Adanır, 2020), Saudi Arabia (Alsadoon, 2017), Jordan (Al-Momani, 2021), Bulgaria (Peytcheva & Aleksieva, 2021), and Germany (Küppers and Schroeder, 2018). All confirmed that the students who participated in their studies had a positive perception of e-assessment. However, this positive perception may be because students may have cheated to get a higher grade in the case of unsupervised e-assessment. This has been confirmed by Rezai & Fadaie (2022). They found in their study a high level of cheat among students of the University of Tabriz in Iran during the online assessment. Moreover, item 33 "I have a computer for personal use at home" received a slightly low score (M = 2.87, SD = 0.9). This affects the total score. According to other researchers (Peytcheva & Aleksieva, 2021), the technological factor like having a personal computer, mobilization of software, and a good Internet connection will help to use the online exam effectively.

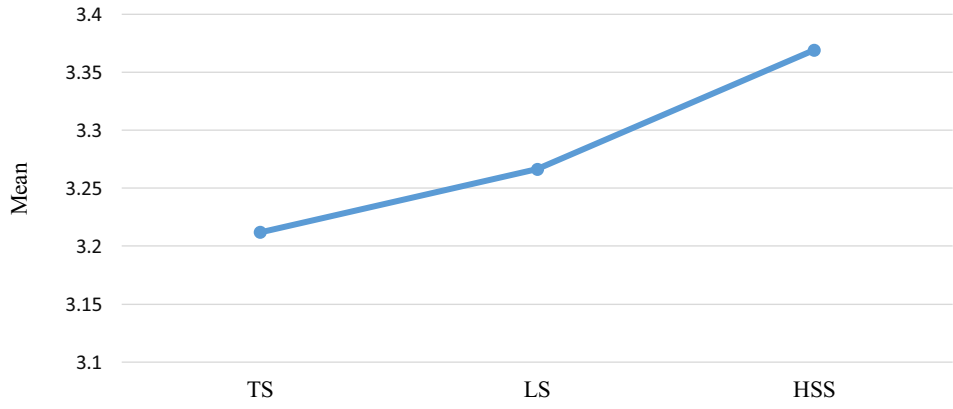

Figure 2.
Students' Perception of E-assessment by Field of Study.

The second research question was "Are there statistically significant differences between the responses of sample individuals to the study tool due to each of the variables: gender, field of study and academic level?" Based on the analysis of the data, it was observed that there was no significant difference in the perception of e-assessment among male and female students. These findings align with a previous study conducted by Ilgaz & Afacan Adanır (2020), which investigated the influence of gender on the perception of online exams among Turkish vocational school learners in tourism and hotel management programs. In that study, gender was also found to have no significant effect on learners' perception of online exams. Elmehdi & Ibrahem (2019) also reported that there were no statistically significant differences in Sharjah University (United Arab Emirates) students' perception of e-assessment in terms of gender. On the other hand, the study by Kundu and Bej (2021) demonstrated that in India, male students have a better attitude toward e-assessment than female students. Females tend to be more stressed than males during e-assessment (Afacan et al., 2020) and they seem to have lower confidence in using technology(Küppers & Schroeder, 2018). Also, males are better at using computers, which favors their perceptions of the e-assessment. (Bahar & Asil, 2018).

Concerning the academic level, the study showed that it had no influence on students' perception of e-assessment. Similar results have been found in other studies (Kingston, 2009; Bahar & Asil, 2018). However, Iskander et al (2021) stated that postgraduate students are more open and comfortable with e-assessment than lower-level students. In addition, in this study, he found that there was a significant difference between students' perceptions of e-assessment among fields of study. It was more in favor of the specialties of art, English language, and social sciences rather than mathematics. Their results appear to be in line with the current study. The students of LS and HSS were found to have better perceptions than the students of TS.

A positive perception of students is a necessary condition for the success of any teaching or assessment process. Considering the importance of e-assessment, especially after the coronavirus pandemic, this exploratory study aimed to investigate students' perceptions toward e-assessment in the Algerian university. The results showed that the level of students' perception of the e-assessment is considered positive. Moreover, there are no statistically significant differences among the average students' perceptions of gender and academic level variables. However, there are statistically significant differences among the means of student perceptions of e-assessment due to the field of study variable and in favor of HSS.

In light of the results of this exploratory study, which could be used, even in small parts, in future scientific themes concerning e-assessment, the researcher recommended:

- to continue to use the e-assessment while providing all the necessary technical means and adequate training for teachers in the use of the different software products for the e-assessment;
- to realize a similar study on the perception of university teachers toward e-assessment;
- to conduct a study on factors that may influence students' perceptions of assessment; and
- to conduct more studies to reveal students' perceptions of the educational environment in the light of new variants and other universities.

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Informed Consent: Written informed consent was obtained from all participated in this study.

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