The pass/fail grading system at Jordanian universities for online learning courses from students' perspectives

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This study aimed to investigate the perspectives of Jordanian university students toward the pass/fail grading system (PFGS) that was used during the COVID-19 pandemic. To achieve this goal, a questionnaire was prepared, consisting of 37 items in its final form; divided into four subscales: advantages, drawbacks of (PFGS), the reasons for its use by students, and their attitudes toward it. This questionnaire was applied to a sample of 6,404 male and female students from four Jordanian universities: Al al-Bayt University, Balqa Applied University, The Hashemite University, and The University of Jordan. Out of the 6,404 responses, we rejected 263 responses due to careless survey filling and/or incomplete answers. The results revealed that most students were satisfied with applying the PFGS to all courses, especially among the freshmen. They believed that the PFGS was the best choice for grading due to online exams and full distance learning lectures. The results showed significant differences at $\alpha = 0.05$ in how students evaluated the PFGS; namely: its advantages, drawbacks, reasons, and their attitudes toward it, based on participants' gender, school, and academic level. As for the relationship between GPA and students' perspectives on the PFGS, it was clear that the correlation coefficients indicated weak but significant correlations.

1. Introduction

For around 3 years, the COVID-19 pandemic caused by the SARS-CoV-2 virus has caused radical changes in many aspects of life at various levels around the world. Local communities in every country have been affected with regard to their ways of life. Health, social, economic, and cultural sectors, among many others, have also been affected.

Apart from the devastating health consequences of the COVID-19 pandemic, its impact on education, particularly on higher education and pedagogical issues, was immense. The regular functions of educational institutions were temporarily changed, and face-to-face classes were impeded. This, in turn, required quick intervention to maintain the continuity of the educational process and to ensure the quality of its outcomes. To cope with these unexpected, sudden repercussions, many governments switched to various types of online

learning methods (synchronous, asynchronous, and hybrid). In Jordan, the case was not different; this, in turn, led the government to make decisions related to the teaching/learning processes and evaluation methodologies, including offering students the pass/fail grading system (PFGS) option, giving students the right to select either the PFGS or discretionary grading (DG). In a step aimed to have some control over the use of the PFGS option for graduate courses, some universities, such as The University of Jordan (JU), decided to limit the number of courses that a student is allowed to take using this option: no more than 50% of the total number of courses they attend can be under the PFGS. However, this number is left open for undergraduate students.

The academic achievement of the student is measured based on his performance on tests developed by faculty members or tasks given to them by their instructors. However, some of them use the (PFGS), while others do not use it, which makes the cumulative average of students from the same major, not comparable based on whether they use the option or not. Not to mention that the student's transcript is viewed as a student's bank statement. If this statement is inaccurate or invalid, then all decisions based on it will also be inaccurate. However, the students showed a degree of enthusiasm to use this option and even demanded it considering distance learning and assessment. As such, to come up with the best recommendations to improve the teaching/learning environment, the researchers selected to assess the PFGS evaluation method during the second semester of the 2020–2021 Academic Year (between 21 February 2021, and 1 June 2021).

1.1. The present study

The evaluation of students' achievements in light of the COVID-19 pandemic opened new horizons for the assessment process. During the discussion with many teachers and students at (JU) and other local universities, many of them made observations regarding the use of the PFGS, ranging between agreement and disagreement. Some educators believe that the implementation of the PFGS option will reflect negatively on students because the appearance of this in students' transcripts does not reflect the true academic level of their performance, which in turn affects them in obtaining job opportunities after graduation or enrolling in graduate studies, especially in countries that do not apply this option. This assessment option may confuse the teaching staff in calculating the GPA and ranking in light of the lack of knowledge of students' real marks, which makes it difficult to differentiate between them and constitutes an imbalance in competition, as well as the inability to measure courses' learning and teaching outcomes. On the other hand, the students acknowledge that the PFGS option comes due to the ineffectiveness of e-learning in its current form, where all lectures are delivered remotely. Students believe that their fair rights entail that they return to the university campus to receive a quality direct education and that they should be given the option of adopting the PFGS so that their cumulative average is not affected by the inadequate capabilities of universities to provide decent e-learning services, compounded with the lack of e-learning tools available to many students.

Therefore, this study aims to explore the perspectives of Jordanian university students regarding this (PFGS), their concerns

and the motives behind their use of it, and the relationship of these perspectives to some demographic variables, such as gender, school type, and school year.

The importance of this study lies in two aspects: the first is theoretical, and the second is practical. On the level of theoretical importance, this study is expected to contribute to enriching the theoretical literature related to grade systems, specifically the binary system, pass/fail, promoting studies and research related to it, and advancing scientific research in this context.

At the level of practical importance, it is expected to provide the universities' administration with a database that can help them to improve their practices.

1.2. Research questions

The research questions tried to investigate the perspectives of bachelor's degree students regarding the PFGS according to variables such as students' gender (male and female), school category (humanities, sciences, and medicine), and academic level (freshmen, sophomore, junior, and senior) during the COVID-19 pandemic. **Figure 1** presents the research question addressed in this research.

To the best of the authors' knowledge, this type of comprehensive work has not been conducted elsewhere with the given details. The contribution of this work focuses on evaluating many students' opinions about the *optional* PFGS, which is applied during the COVID-19 pandemic in higher education for public and private universities, from their own perspectives in terms of its advantages, its drawbacks, their reasons for using this option, and their attitudes toward it. The results of the study are expected to contribute to directing the attention of employees and decision-makers in Jordanian educational institutions toward reducing the defects of the PFGS and enhancing and improving its efficiency.

The rest of this work is organized as follows: section 2 presents good deal of literature review, section 3 presents the method that has been followed, section 4 covered the results interpretation, analysis, and discussion, section 5 introduced the discussion of limitations and recommendations, and finally the conclusion is drawn in section 6.

2. Literature review

Two years ago, at the beginning of the COVID-19 pandemic, many universities were not ready to face the crises that occurred

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Research Question:

- *What are the students' perspectives regarding the PFGS at Jordanian universities during the COVID-19 pandemic?*
- *Are there any significant differences at α=0.05 in students' perspectives of the PFGS attributed to gender?*
- *Are there any significant differences at α=0.05 in the students' perspectives of the PFGS attributed to the school category?*
- *Are there any significant differences at α=0.05 in students' perspectives of using the PFGS attributed to academic level?*

FIGURE 1
Research questions.

TABLE 1 Advantages and disadvantages of adopting the PFGS according to the literature.

Advantages	Disadvantages
1. It reduces the stress and pressure of achieving needed grades	1. It has no improvements on the grades
2. It develops students' motivation to learn and self-routing	2. Not all students have the same opportunity of taking pass/fail credit
3. It enables students to take additional courses and achieve their goals	3. Students require special guidance
4. It improves quarterly grade point average than others	4. It has problems in transferring to other institutes
5. It enhances intellectual curiosity and self-stimulation	5. It has negative competition between students and bad discernments results
6. It simplifies academic and university life to students	6. It can cause stress
7. It improves the solid competition and encourages weak students to extend their efforts	7. It limits the possibilities of spotting excelling students
8. It has positive effects on students' enjoyment and mood	8. It has a lack of clarity in the set of standards
9. It supports group cohesion and collaboration	
10. It enhances the well-being, satisfaction with education, and mental health of students	

because of the SARS-CoV-2 virus, as educational systems were dependent on the physical presence of students and teachers. Moreover, students faced several issues, such as the postponement of exams, the cancelation of flights, and difficulty in conducting interviews for scholarships, among others (Quacquarelli Symonds, 2020). Therefore, to deal with the crisis and maintain a good quality of education, universities applied several quality assurance procedures. On the other hand, several universities changed their methods of grading and assessment, such as using the PFGS instead of a scaled grading system, changing the number of credits required to complete the qualification requirements, using various assessment formats such as open book exams, and in some cases changing the classification profiles and degree algorithms (Gamage et al., 2020). In several countries, decision-makers have tried to protect the high standards of academic and education quality by following certain procedures, and they have assessed the impact of these procedures on students' performance based on academic achievement (Gallardo-Vázquez et al., 2019).

The outbreak of the COVID-19 pandemic illuminates daunting disparities in the equity and fairness of traditional grading systems. Initially, school districts around the nation offset these equity gaps by developing hold harmless policies designed to either freeze students grades in time or measure them as pass/fail (Maxwell, 2021).

Castro et al. (2020) mention that grading policies remained a local decision in California, for example, on April 2, 2020, California Department of Education released a set of frequently asked questions that outlined possible grading options. These options included the following:

- Assign final grades based on students' third-quarter grades or their grades when the school shutdown occurred.
- Allow students to opt out of completing a course, thereby receiving an "incomplete" until they can finish the course.
- Allow students to choose whether they want to accept their current grade or continue with independent study.
- Assign students pass/no pass or credit/no credit.
- Assess students on essential standards using a rubric model instead of percentages.

At the core of the pass/fail debates, lies the issue of fairness, which in this context entails simply ensuring that all students have the same benefits and opportunities based on the grading system given their academic performance. In the pass/fail system, students who work harder and achieve more are not recognized, or distinguished by their performance. Not only does this undermine

FIGURE 2
Participant distribution. (A) Gender percentages; (B) school type percentages; (C) year percentages.
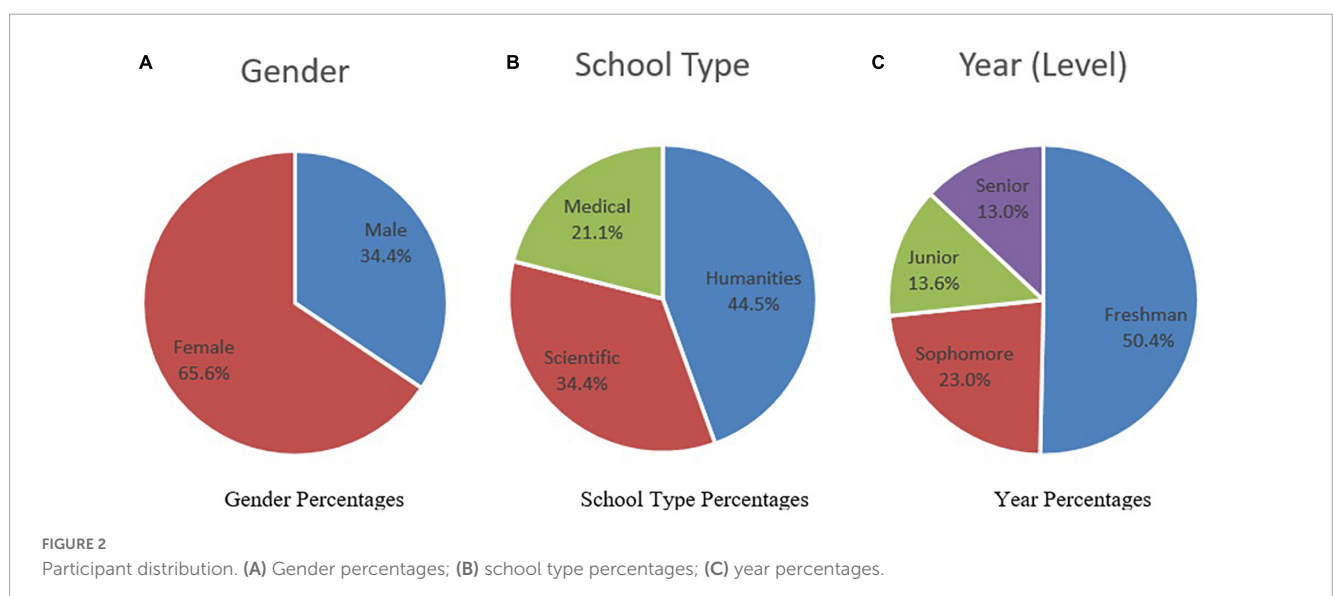
the fairness of the system, as students with radical differences in effort and performance receive the same grades, it further reduces the incentive for students to work hard and achieve their learning goals. However, it can also be used as an effective strategy in a time of crisis or in other disaster situations to help retain students (Cumming et al., 2020).

Educational measurements for evaluating students in higher education have been the biggest concern for a long time, and many studies in the literature have been conducted to measure the quality of each. PFGS is found to be beneficial by authors.

We presented the literature in chronological order first, then we wrapped our findings in a table that that summarized the advantages and disadvantages of adopting the PFGS.

The impact of the pass/fail system was researched by Gold et al. (1971). Participants in their study were Cortland College students from the State University of New York. Two groups participated in the study: one group expressed interest in taking all courses with pass/fail grading, while the other group expressed interest in taking just one pass/fail course. Furthermore, 28% of the freshmen wanted to take all their courses on a pass/fail grading, while 78% of the freshmen and 80% of the juniors wanted to take only one pass/fail course. The results of their study revealed that there were no improvements in the grades obtained in the non-pass/fail courses. On the other hand, when the data for the freshmen and the juniors were combined, the students taking one pass/fail course received lower grades in their pass/fail course than in their non-pass/fail courses. However, the PFGS has the advantage of relieving grading pressure for some courses in the students' majors and could help develop students' motivation to learn.

McLaughlin et al. (1972) explored how college, major, and academic year influenced eligibility and the decision of students to take pass/fail courses. The results of this research showed that not all students have the same opportunity of taking pass/fail credit. Students who utilized the pass/fail option took additional total hours and earned a better quarterly grade point average than the others. This research also suggested that students could take additional academic courses for a pass/fail grade with no expected adverse effects on their academic records. In addition, this research focused on two important points that need further study. The main one was related to the number and content of the academic courses that were taken when a pass/fail option was available. The second point concerned whether students would take more academic courses than required when the pass/fail option was available.

Wittich (1972) conducted a study utilizing statistical data to examine the effect of the PFGS on the academic performance of college students. She discovered, among other things, that PFGS shouldn't be used if strong results for the D-passing level are anticipated from cumulative learning subjects. In addition, using the PFGS option was shown to have several advantages, such as reducing the stress and pressure of the traditional assessment, decreasing the fear of getting poor grades in unfamiliar academic areas, and increasing the level of students' motivation to learn, in addition to instilling more intellectual curiosity. The investigation used data collected from 895 students who studied foreign language courses (French, German, Spanish, and Russian). Of the 895 students, 305 opted for the pass/fail system and received conventional grades, and it turned out that their grades were lower than those of the 570 students who chose to remain under the traditional system. The instructors who awarded these grades did not know which of the students chose the pass/fail option.

A literature survey on PFGS written between 1968 and 1971 is presented in Otto (1973). This survey formed the following conclusions: (1) students do not choose pass/fail to avoid evaluation, because it was found that their performance in all courses, regardless of the evaluation method, deteriorated; (2) students resort to a pass/fail option to make things easier for them in academic courses and not to expand into additional academic fields; (3) freshmen suffer academically more than others from taking pass/fail grades, thus they need special guidance before they are allowed to select this option; and (4) students who have been assessed on a pass/fail basis may face difficulties in the institutions they wish to transfer to or in the higher education stages.

Reddan (2013) conducted a study to illustrate the advantages of introducing the standard course grading method to work-integrated learning. The results of the study indicate that the students supported the change from a non-graded (pass/fail) system to a graded assessment system. The reason for this is that it presented tangible competition; this result helped students learn and encouraged weaker students to extend their efforts. On the other hand, this study also recommended that the teachers be mindful, since evaluation, in some cases, can cause excessive competition between students and produce conceivable negative discernment results (e.g., subjects focusing more on the students instead of on the learning outcomes). Lastly, the subjects considered that grading boosted their endeavors to prepare for their future careers through an emphasis on skills that were significant to employability.

Melrose (2017) highlighted the advantages and disadvantages of the PFGS and Discretionary Grading (DS) approaches, which are the two most commonly used educational measurements. In his paper, he stated that both approaches have benefits and can efficiently measure students' achievements in nursing education programs. He said that although PFGS helps in intrinsic motivation and self-routing, it limits the possibility of spotting excelling students. On the other hand, DS helps extrinsic motivation and self-improvement even though it could promote unhealthy competition.

McMorran et al. (2017) analyzed what is called a "gradeless learning" policy at a large public university in Asia—the National University of Singapore (NUS). This policy was implemented in August 2014 and involved nearly 7,000 first-year students during their first semester. This paper found that most students affirmed that "gradeless learning," such as pass/fail systems, can reduce stress and help students acclimate to university life. Additionally, it showed that gradeless studying might also introduce new sources of stress that undermine the system's goals. Institutions have to be aware of these conceivable sources of stress and address them with ample planning, clear clarification, and cautious implementation of any gradeless learning policy.

Quality and standards concepts are highly related and interconnected. Quality is considered in a set of activities, such as teaching, assessment, research, curriculum, and students' learning and experience (Thompson-Whiteside, 2013). On the other hand, the standard-based approach uses a set of pre-determined standards that are developed externally to appraise universities. For example, the minimum requirement approach evaluates whether or not universities are fulfilling a set of minimum requirements, while in fit-for-purpose approaches, performance is assessed by a set of predefined goals (Wang, 2014).

Some studies have indicated that the PFGS has benefits and advantages (Rohe et al., 2006; Strømme, 2019). However, other studies have indicated that the PFGS has some drawbacks and may have a negative impact by decreasing academic achievement (Gold et al., 1971). In addition, it has a negative effect on students competing for job positions (Dietrick et al., 1991; Guo and Muir, 2008).

Some researchers (Strømme, 2019) found that the PFGS has positive effects on students' enjoyment and academic achievement. Others (McLaughlin et al., 1972) explored how college, major, and academic year influenced students' eligibility and their decisions to take the PFGS courses.

In the past decade, a number of studies have focused on studying the effect of PFGS on the performance of medical students and physicians. For example, Dietrick et al. (1991) studied the effect of the PFGS on students' competition for residency positions in general surgery compared to the non-pass/fail grading system. Their survey was completed by the general surgery residency program directors. The survey results revealed that the majority of respondents preferred non-pass/fail grading systems rather than the PFGS for student evaluation and that 89% of program directors preferred to review medical students' transcripts using a non-pass/fail grading system. They also found that the PFGS has a disadvantage and does not have a good effect on competition for general surgery residency positions.

In a study by Joshi et al. (2018), the authors specified the following set of features for the PFGS: high standards to achieve the passing score, the need for a supplement of tools to guarantee these standards, and constructive feedback and room for reflection. They indicated that the PFGS decreases the level of competition among students, but it supports a collaborative learning environment. It also enhances the well-being, satisfaction with education, and mental health of students.

Rohe et al. (2006) studied the impact of PFGS on medical students in terms of psychological parameters, such as mood, group cohesion, and test anxiety. The participants in this study were medical school students in the graduating classes. Their results provided evidence of the advantages and benefits of the PFGS compared to the traditional grading system (non-pass/fail) during the basic science years of an undergraduate medical school curriculum with the 5-interval grading system (F gets a 1, D gets a 2, C gets a 3, B gets a 4, and A gets a 5). They found that PFGS can reduce stress, improve mood, and increase group cohesion for medical students compared with the traditional grading system. There were no statistically significant differences in all variables measured between the two systems.

Many review papers have discussed the literature assessing the impact of the use of PFGS in medical schools. Spring et al. (2011) performed a systematic search of research published between 1980 and 2010. They concluded from numerous papers that the PFGS enhanced student well-being, but academic performance was not affected by this system. However, it may affect some decisions regarding the choice of the residency program.

Another review made by Ramaswamy et al. (2020) discussed the benefits of PFGS in dental education. Their review covered numerous research papers that examined the use of the PFGS in North America. It demonstrated that using success can improve student well-being, facilitate self-stimulation, and promote competency-based learning compared to the letter

grading system. Moreover, it may help dental educators achieve their elementary goals more effectively. However, the PFGS may face many challenges, such as a lack of clarity in setting pass/fail standards.

One of the researchers examined the effect of the PFGS on computer science majors (Strømme, 2019). The author described preferred practices that make the pass/fail course in computer science successful. He defined these practices by studying the results of one pass/fail course in Algorithms Engineering. A student is required to successfully pass 13 assignments, one for each week, in order to pass the course. They found that the PFGS has positive effects in terms of student enjoyment and academic achievement. They argued that pass/fail courses in computer science can be made successful by applying three practices: setting a high enough threshold for passing, providing clear course requirements, and using formative evaluation.

It is worth mentioning that, in a session held on 4 April 2020, the Jordanian Council of Higher Education Deans approved a pass/fail grading system as an optional principle for undergraduate and graduate degree students, without having any effect on the licensure-pursuing education in universities and their academic programs (Ministry of Higher Education and Scientific Research, 2020).

To wrap this section, we summarized the major advantages and disadvantages of the PFGS in Table 1.

Several medical schools changed their student assessment and evaluation from a discriminating grade scale, which includes four values (fail, pass, high pass, and honors), to a pass/fail grading scale. The effect of this transformation on the grades of a second-year class was studied by Dignath et al. (2008). The results showed that the statistical changes, such as performance, increased in all courses except two. Furthermore, students were very satisfied with the pass/fail grading scale for several reasons, including the enhanced collaboration between students, the decreased competition, the increased time for activities, and the "leveled playing field" for students with different backgrounds.

Again, it was found that some studies were in favor of the PFGS (pros), while some were against it (cons). Some of the previous studies focused on the categories of students (e.g., medical students), while others focused on the aspects of evaluation (e.g., stress and collaboration).

As can be seen from Table 1, there are many advantages and disadvantages related to adopting the PFGS. This forms a strong foundation for making this comprehensive detailed study to help both students and academic decision-makers address all the issues of such a system, especially after the COVID-19 pandemic.

3. Materials and methods

This study is a descriptive survey that aims to describe the phenomenon as it occurs on the ground by shedding light on students' perceptions and beliefs about the PFGS option in order to identify the advantages and disadvantages from their point of view, in addition to the reasons for activating and applying this option.

This section provides an overview of the research methods used in the study. It contains details about the participants and how they were sampled. It also covers the instrument used to collect data and the methods used to validate it.

TABLE 2 Cross-tabulation of the universities, school types, and university levels of the participants.

Sex	University/College category			Student's level				Total
				Freshmen	Sophomore	Junior	Senior	
Male	AAU	College	Humanities	2	2	5	1	10
			Scientific	7	0	1	0	8
		Total		9	2	6	1	18
	BAU	College	Scientific	2	9	13	2	26
			Medical	1	0	0	0	1
		Total		3	9	13	2	27
	HU	College	Humanities	248	113	53	57	471
			Scientific	256	166	100	158	680
			Medical	149	81	24	25	279
		Total		653	360	177	240	1,430
	JU	College	Humanities	81	46	49	46	222
			Scientific	139	48	42	64	293
			Medical	79	18	16	11	124
		Total		299	112	107	121	639
	Total	College	Humanities	331	161	107	104	703
			Scientific	404	223	156	224	1,007
			Medical	229	99	40	36	404
		Total		964	483	303	364	2,114
Female	AAU	College	Humanities	5		2	1	8
			Scientific	3		0	0	3
		Total		8		2	1	11
	BAU	College	Humanities		0	0	1	1
			Scientific		13	5	7	25
		Total			13	5	8	26
	HU	College	Humanities	751	341	174	128	1,394
			Scientific	324	173	116	108	721
			Medical	380	155	50	58	643
		Total		1,455	669	340	294	2,758
	JU	College	Humanities	287	152	118	69	626
			Scientific	218	58	46	37	359
			Medical	160	38	24	25	247
		Total		665	248	188	131	1,232
	Total	College	Humanities	1,043	493	294	199	2,029
			Scientific	545	244	167	152	1,108
			Medical	540	193	74	83	890
		Total		2,128	930	535	434	4,027
Total	AAU	College	Humanities	7	2	7	2	18
			Scientific	10	0	1	0	11
		Total		17	2	8	2	29
	BAU	College	Humanities	0	0	0	1	1
			Scientific	2	22	18	9	51
			Medical	1	0	0	0	1
		Total		3	22	18	10	53
	HU	College	Humanities	999	454	227	185	1,865
			Scientific	580	339	216	266	1,401
			Medical	529	236	74	83	922
		Total		2,108	1,029	517	534	4,188
	JU	College	Humanities	368	198	167	115	848
			Scientific	357	106	88	101	652
			Medical	239	56	40	36	371
		Total		964	360	295	252	1,871
	Total	College	Humanities	1,374	654	401	303	2,732
			Scientific	949	467	323	376	2,115
			Medical	769	292	114	119	1,294
		Total		3,092	1,413	8,38	798	6,141

TABLE 3   The subscales of the questionnaire with their items.

Subscales	Number of Questions	Question number
Advantages of the PFGS	10	1–10
Drawbacks of the PFGS	10	11–20
Reasons for selecting the PFGS	10	21–30
Attitudes toward the PFGS	10	31–40

3.1. Participants

This paper evaluates the opinions of 6,404 students about the PFGS. Their responses were collected through a survey distributed to them during the second semester of the Academic Year 2020/2021 at four Jordanian universities: Al al-Bayt University (AABU), Balqa Applied University (BAU), The Hashemite University (HU), and The University of Jordan (JU). The students' schools were categorized into three main types: humanities, medicine, and sciences. They were invited to answer the survey optionally and at their convenience. After reviewing all responses, we rejected 263 invalid responses for the reasons listed below.

1. Answers were filled carelessly by selecting "strongly disagree", "strongly agree" or "neutral" for the whole set of 40 questions.
2. The survey was partially filled out and many questions were left blank.

Figure 2 shows the participants' profiles of the 6,141 validated responses. The participants' profiles show that 34.4% are male and 65.6% are female (**Figure 2A**). Among them, 44.5% of the participants were from humanities schools, 34.4% were from science schools, and 21.1% were from medical schools (**Figure 2B**). The majority of them were freshmen (50.4%), while seniors comprised the lowest percentage of participants (13.0%) (**Figure 2C**). Also, the profile shows that 68.2% are from HU and 30.5% are from JU, while the other two universities have a minor number of participants (0.9% from BAU, and 0.5% from AABU). This was due to our late notice of including students from these two universities.

To investigate the distribution of the study sample according to the demographic variables, cross tabulation was explored as shown in **Table 2**.

Table 2 shows that some cells contain a sufficient number of students according to all categories of the variables, although other cells contain a very small number of participants, which may affect the homogeneity of the variance between groups.

3.2. Instrument

A questionnaire was developed based on a literature search of articles in pass/fail grading systems databases, such as Quacquarelli Symonds (2020), Wang (2014), Wittich (1972), and Melrose (2017). The survey consisted of 37 questions, grouped into four major categories: PFGS advantages, PFGS drawbacks, students' reasons for choosing PFGS, and students' attitudes toward the PFGS. Each category comprised 10 questions, except the fourth one, which

comprised only 7 questions. **Supplementary Appendix A** shows the survey content of the groups and their questions. As shown in the survey, some other factors influenced the students' opinions, such as study year, gender, and their grade point average (GPA).

To incorporate many students to participate in the survey, the researchers did their best to avoid administering the survey during their exam period, and the survey was left activated for more than two weeks. In addition, students were encouraged to participate through social media. The sample space comprised students from different university levels and schools.

The items of the questionnaire were written and distributed to subscales after several brainstorming sessions involving researchers via the Microsoft Teams platform. These items were reformulated using language appropriate for the study population; it contains 40 items in its initial version distributed among four subscales. **Table 3** shows the details.

The 5-point Likert scale is utilized to gauge the student's opinions about the PFGS. **Table 4** summarizes the answers and the weight of each one.

These weights were reversed for Questions 34, 36, and 40. These three questions were reversed in the fourth subscale to validate the students' responses.

The Grand Average Weight (GAW) for all answers is 3.0; it is calculated as the summation of all weights divided by their count as follows:

$$GAW = (5 + 4 + 3 + 2 + 1)/5 \qquad (1)$$

When the GAW value is equal to or greater than 3, it indicates agreement by the students; however, when GAW is less than 3, it indicates that the students do not agree with the statement.

3.2.1. The psychometric characteristics of the questionnaire

The validity and reliability of the questionnaire were verified using the following methods:

First, the content validity of the survey/questionnaire was verified by presenting it to five experienced and competent arbitrators in the fields of IT, education, and psychology. Their opinions were reviewed, studied, and made appropriate in terms of the accuracy of the formulation. The survey was then pilot-tested and applied using online Google Forms and Microsoft Forms. The discrimination indices (Di) of the items were investigated using item–total correlation (ITC) (Ebel and Frisbie, 1986; Hulin et al., 2001). **Supplementary Appendices B–E** shows these results for the four subscales: Advantages, Drawbacks, Reasons, and Attitude respectively.

As can be seen in **Supplementary Appendix B**, the discriminant index for the "Advantages" subscale is in the range of 0.28 to 0.61. For the "Drawbacks" subscale, it is in the range of 0.72 to 0.80 (**Supplementary Appendix C**). For the "Reasons" subscale, it ranges from 0.52 to 0.62 (**Supplementary Appendix D**), and it ranges from 0.12 to 0.52 for the "Attitudes" subscale (**Supplementary Appendix E**).

Ebel and Frisbie (1986) give the criteria for determining the quality of the items based on the discrimination index (Di): if the Di value is greater than 0.39, it is excellent; if the Di value is in the range 0.30 to 0.39, it is good; if the Di value is in the range of 0.20 to 0.29, it is moderate; and if the Di value is in the range of 0.00 to 0.20, it is poor. Therefore, it could be concluded that almost all questionnaire items (questions) are excellent, since the Di is greater

TABLE 4   Answer weights.

Answer	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Weight	5	4	3	2	1

TABLE 5   Reliability coefficients using the Cronbach's alpha equation and the split-half using the Spearman-Brown equation.

Subscales	Number of Questions	Cronbach alpha	Split half Spearman-Brown
Advantages of PFGS	10	0.83	0.80
Drawbacks of PFGS	10	0.94	0.87
Reasons for using PFGS	10	0.85	0.75
Attitudes toward PFGS	7	0.77	0.67

TABLE 6   The frequencies, means, and standard deviations of scores for questions under the Advantages subscale.

Question	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	Mean out of 5	Std. deviation
1. It helps the student to maintain his/her GPA.	1.8	2.3	5.5	34.0	56.4	4.41	0.84
2. Eliminates the feeling of embarrassment of weak grades.	4.2	7.0	10.3	32.8	45.7	4.09	1.10
3. It gives a feeling of cooperation among all, so students feel that there is no difference between literal symbols such as A, B, C. etc.	9.4	17.7	22.0	25.8	25.0	3.39	1.29
4. All students are encouraged to engage more deeply in the content of the subject matter.	7.8	11.9	14.6	29.1	36.6	3.75	1.28
5. Relieves pressure to get an A in every mission.	6.1	11.4	9.5	33.8	39.2	3.89	1.22
6. The subjects whose results are allowed to be monitored (pass/fail) do not need to exert much effort on the part of the student.	17.2	27.1	13.9	24.4	17.3	2.97	1.38
7. Makes the student feel comfortable and without psychological pressure during the exams.	8.4	14.8	7.8	32.5	36.5	3.74	1.31
8. It makes the student tend to focus on scientific benefit more.	4.9	6.8	10.5	31.0	46.9	4.08	1.13
9. It helps alleviate some of the pressures caused by the measures taken to prevent the spread of Corona.	2.3	2.3	6.8	29.8	58.9	4.41	0.89
10. It helps to compensate for the lack of capabilities available to the student for distance learning.	1.8	2.3	5.5	34.0	56.4	4.38	0.92
Advantages of PFGS						**3.91**	**0.72**

TABLE 7   The frequencies, means, and standard deviations of scores for questions under the "Drawbacks" subscale.

Answer	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	Mean out of 5	Std. deviation
11. It could negatively affect future job opportunities.	20.8	23.7	25.6	17.3	12.6	2.77	1.30
12. It could negatively affect admission to graduate studies programs.	17.9	22.6	32.3	17	10.2	2.79	1.22
13. It could negatively affect admission to university scholarships.	18.1	24.1	32.8	16	9	2.74	1.19
14. It may adversely affect granting students' academic discounts.	17.1	23.2	37.1	14.8	7.7	2.73	1.14
15. Makes the student feel that their true performance is no longer important.	28.6	31.2	13.2	15.6	11.4	2.5	1.35
16. It makes the student satisfied only with the minimum to pass.	27.9	29.2	13.7	19.1	10.2	2.54	1.34
17. It leads to laxity of the student when he knows that his evaluation will be on the basis of success/failure.	30.7	28.6	12.2	17.6	10.9	2.49	1.37
18. Students are encouraged not to attend lectures and participate.	44.1	29.6	8.9	9.9	7.6	2.07	1.27
19. It gives a feeling of frustration because everyone will receive the same recognition, regardless of their level of understanding of the content.	33.3	27.3	13.9	14.3	11.2	2.43	1.37
20. This option indicates that the student studied the subject but does not indicate exactly the strengths of the student.	18.4	24.9	23.7	23.8	9.2	2.81	1.25
Drawbacks of pass/fail						**2.59**	**1.04**

TABLE 8 The frequencies, means, and standard deviations of scores for questions under the "Reasons" subscale.

Answer	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	Mean out of 5	Std. deviation
21. To overcome the problem of difficult exams.	3.5	7.9	13.1	39.2	36.3	3.97	1.06
22. To bypass the return of the article.	3.3	7.1	15.2	40.5	33.9	3.95	1.04
23. Because the material is tough, and it is not easy to get a high mark in it.	4.6	10.1	13.7	37.6	34	3.86	1.13
24. In order to raise or maintain his GPA.	1.8	2.2	8.6	40.8	46.5	4.28	0.85
25. Because of the one-way system, which negatively affected students' results.	1.9	2.3	9.7	22	63.9	4.44	0.90
26. Because he has passed through personal circumstances such as illness or sick care, which prevent him from preparing well for exams.	1.4	2.2	10.8	31.1	54.6	4.35	0.86
27. Because of his lack of electronic capabilities that make him abide by the lectures.	1.5	3.5	12.1	30.3	52.6	4.29	0.92
28. Because of an emergency electronic defect while taking the exams remotely.	1.1	1.5	8.6	26.6	62.1	4.47	0.81
29. To get rid of the warning penalty resulting from a low GPA.	3.6	6.8	25.4	31.9	32.3	3.83	1.07
30. To overcome the difficulty of moving from face-to-face learning and assessment to remote learning and evaluation.	1.9	3.6	17.1	33.3	44	4.14	0.95
Motivation for choosing pass/fail						**4.16**	**0.63**

TABLE 9 The frequencies, means, and standard deviations of scores for questions under the "Attitudes" subscale.

Answer	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	Mean out of 5	Std. deviation
31. My prior knowledge with a pass/fail decision made me receive the content of the materials comfortably and without psychological pressure, and I would benefit more scientifically.	4.4	5.8	12.5	30.3	47.1	4.1	1.10
32. I have no objection to the appearance of a pass/fail option in my final score sheet with the result.	10.3	9	17.4	32.6	30.7	3.64	1.28
33. I believe that monitoring the course results with a pass/fail option is always in the best interest of the student.	4.6	9.6	17.9	29.5	38.4	3.87	1.16
35. I believe that monitoring the material results with a pass/fail option is appropriate for all subjects without exception.	7.3	15	16.5	26.6	34.6	3.66	1.29
37. I am in favor of applying the pass/fail option for grading results even if the education returns to the face on campus.	10.4	12.4	14.1	23.1	40	3.7	1.37
38. I am confident that selecting pass/fail will increase my GPA.	2.9	6.6	17.8	37.2	35.5	3.96	1.03
39. In my opinion, the possibility of converting my result to pass/fail made me increase the number of courses registered.	10	22.5	20.3	23.7	23.5	3.28	1.31
Attitudes toward pass/fail						**3.75**	**0.80**

TABLE 10 Means, standard deviations, and Z-values of the scores of the study sample on each of the subscales according to gender.

Gender		N	Mean	Std. dev.	Mean rank	Z	sig	ES
Advantages	Male	2,114	3.92	0.72	3,101.36	−0.97	0.33	
	Female	4,027	3.90	0.72	3,055.06			
Drawbacks	Male	2,114	2.49	1.07	2,891.75	**−5.75****	**<0.001**	**0.07**
	Female	4,027	2.64	1.02	3,165.10			
Reasons	Male	2,114	4.12	0.64	2,954.84	**−3.37****	**<0.001**	**0.04**
	Female	4,027	4.18	0.63	3,131.98			
Attitudes	Male	2,114	3.73	0.81	3,036.65	−1.10	0.27	
	Female	4,027	3.75	0.64	3,089.03			

**Significant at 0.01.
Bold means significant values.

Means, standard deviations, and K-W-values of the scores of the study sample on each of the subscales according to school category.

School type		N	Mean	Std. dev.	K-W	Sig	Eta square
Advantages	Humanities	2,732	3.95	0.72	17.03**	<0.001	0.01
	Scientific	2,115	3.90	0.72			
	Medical	1,294	3.85	0.73			
	Total	6,141	3.91	0.72			
Drawbacks	Humanities	2,732	2.59	1.03	4.54	0.10	
	Scientific	2,115	2.56	1.05			
	Medical	1,294	2.63	1.03			
	Total	6,141	2.59	1.04			
Reasons	Humanities	2,732	4.15	0.65	4.89	0.09	
	Scientific	2,115	4.18	0.62			
	Medical	1,294	4.13	0.61			
	Total	6,141	4.16	0.63			
Attitudes	Humanities	2,732	3.81	0.79	43.43**	<0.001	0.01
	Scientific	2,115	3.73	0.81			
	Medical	1,294	3.64	0.79			
	Total	6,141	3.75	0.80			

**Significant at 0.01.

TABLE 12 Pairwise comparisons of school type.

Subscales	Sample 1-Sample 2	Test statistic	Std. error	Std. test statistic	Adj. sig.
Advantages	Medical-Scientific	204.44	62.46	3.27	0.00
	Medical-Humanities	386.81	59.73	6.48	0.00
	Scientific-Humanities	182.37	51.26	3.56	0.00
Attitudes	Medical-Scientific	126.74	62.50	2.03	0.13
	Medical-Humanities	242.10	59.76	4.05	0.00
	Scientific-Humanities	115.37	51.29	2.25	0.07

than 0.39 for all questions, except for Questions 34 and 36, which were intentionally reversed to validate the questionnaire. Their Di values were 0.12 and 0.13, respectively. Actually, the third reversed question, Question 40, has a low Di value of 0.232, as expected. To identify Questions 34, 36, and 40, they were formatted in a bold and italicized font in Table 9. For the purpose of obtaining realistic statistics, however, these three questions were excluded from the analysis of the questionnaire, and the final version of the PFGS scale was composed of 37 questions.

3.2.2. Reliability of the questionnaire

Before analyzing the questionnaire, its internal consistency (or reliability) was validated. The questionnaire reliability was verified in two ways: Cronbach's alpha equation and the Spearman-Brown equation (Ebel and Frisbie, 1986; Hulin et al., 2001).

- To measure the scale reliability using Cronbach's alpha, we use Equation (2):

$$\text{Cronbach's Alpha} = \frac{k}{k-1}\left(\frac{\sum_{i=1}^{k}\sigma_i^2}{\sigma_t^2}\right) \tag{2}$$

where k is the number of items, σ_i^2 is the inter-item variance, and σ_t^2 is the variance of the total score.

- Scale reliability can also be measured using the split-half Spearman-Brown Equation (3):

$$\text{Spearman-Brown} = \frac{2P_{12}}{1+P_{12}} \tag{3}$$

where P_{12} is the Pearson correlation between the split halves.

Table 5 shows the reliability coefficients using Cronbach's alpha and split-half Spearman-Brown equations after removing the weak questions (Questions 34, 36, and 40).

It is noted from Table 5 that the reliability coefficients for the four subscales using Cronbach's alpha are in the range of 0.77 to 0.94, and these coefficients using the split-half method are in the range of 0.67–0.87. According to Hulin et al. (2001) and Ursachi et al. (2015), a generally accepted rule is that when α is in the range of 0.6–0.7, there is an acceptable level of reliability, and when α is 0.8 or higher, there is a very good level of reliability. Based on this, it can be concluded that the questionnaire is reliable since all calculated α values are above 0.60. Most values are at a very good level, as their α values are above 0.8.

3.3. Statistical procedure

To achieve the goal of the study and answer its questions, the Statistical Packages for Social Sciences (SPSS V 23) from IBM was used to analyze the collected data. The percentages of frequencies, arithmetic means, and standard deviations of students' responses were computed on each item of the questionnaire and its sub-scales. The results of the Mann–Whitney U test were also found to answer the question related

TABLE 13   Means, standard deviations, and K-W values of the scores of the study sample members on each of the subscales and the total score according to academic level.

Subscale		N	Mean	Std. dev.	K-W	Sig	Eta square
Advantages	Freshman	3,092	3.96	0.71	28.15**	<0.001	0.01
	Sophomore	1,413	3.85	0.74			
	Junior	838	3.85	0.73			
	Senior	798	3.90	0.74			
	Total	6,141	3.91	0.72			
Drawbacks	Freshman	3,092	2.65	1.04	52.58**	<0.001	0.01
	Sophomore	1,413	2.61	1.06			
	Junior	838	2.47	1.00			
	Senior	798	2.41	1.02			
	Total	6,141	2.59	1.04			
Reasons	Freshman	3,092	4.17	0.63	4.21	0.24	
	Sophomore	1,413	4.16	0.63			
	Junior	838	4.15	0.60			
	Senior	798	4.12	0.67			
	Total	6,141	4.16	0.63			
Attitudes	Freshman	3,092	3.77	0.80	6.74	0.08	
	Sophomore	1,413	3.72	0.80			
	Junior	838	3.71	0.78			
	Senior	798	3.74	0.81			
	Total	6,141	3.75	0.80			

**Significant at 0.01.

TABLE 14   Pairwise comparisons of school type.

Subscales	Sample 1-Sample 2	Test statistic	Std. error	Std. test statistic	Adj. sig.
Advantages	Sophomore-Junior	−11.27	77.21	−0.15	1.00
	Sophomore-Senior	−141.55	78.42	−1.81	0.43
	Sophomore-Freshman	264.24	56.87	4.65	0.00
	Junior-Senior	−130.28	87.59	−1.49	0.82
	Junior-Freshman	252.97	68.97	3.67	0.00
	Senior-Freshman	122.69	70.32	1.74	0.49
Attitudes	Senior-Junior	142.55	87.63	1.63	0.62
	Senior-Sophomore	367.45	78.45	4.68	0.00
	Senior-Freshman	452.93	70.35	6.44	0.00
	Junior-Sophomore	224.90	77.25	2.91	0.02
	Junior-Freshman	310.39	69.00	4.50	0.00
	Sophomore-Freshman	85.49	56.89	1.50	0.80

to the effect of the student's gender on his perspectives. The Kruskal–Wallis (K-W) test was used to answer the questions related to the effect of school category and academic level. The results of the Spearman correlation were computed to reveal the relationship between students' perspectives and their academic achievement.

4. Results interpretation, analysis, and discussion

This section describes the obtained results and analysis for the research questions.

To answer the first research question: "*What are the students' perspectives about the PFGS at Jordanian universities during the COVID-19 pandemic?*" the frequencies, mean scores, and standard deviations of the scores obtained from the questions answered by the study subjects were extracted. Tables 6–9 show these results.

For the Drawbacks subscale of the PFGS, the frequencies, mean scores, and standard deviations of the scores obtained from the answers of the study subjects were extracted and are shown in Table 7.

It can be noted that the mean for all questions ranged between 2.07 and 2.81 for the Drawbacks subscale, with an overall mean of 2.59. The overall evaluation among students is disagreement since the GAW value is equal to 2.59, which is less than 3.

TABLE 15 Spearman correlation coefficient between students' GPA and their perspectives of the PFGS based on the Advantages subscale.

No.	Items	Student GPA
1	It helps the student to maintain his/her GPA.	−0.08**
2	Eliminates the feeling of embarrassment of weak grades.	−0.11**
3	It gives a feeling of cooperation among all, so students feel that there is no difference between literal symbols such as A, B, C. etc.	−0.12**
4	All students are encouraged to engage more deeply in the content of the subject matter.	−0.15**
5	Relieves pressure to get an A in every mission.	−0.02
6	The courses whose results are allowed to be monitored (pass/fail) do not need to exert much effort on the part of the student.	0.00
7	Makes the student feel comfortable and without psychological pressure during the exams.	−0.01
8	It makes the student tend to focus on scientific benefit more.	−0.11**
9	It helps alleviate some of the pressures caused by the measures taken to prevent the spread of Corona.	−0.04
10	It helps to compensate for the lack of capabilities available to the student for distance learning.	−0.03
	Advantages of PFGS	**-0.10****

**Significant at 0.01.

TABLE 16 Spearman correlation coefficient between the GPA and students' perspectives of the PFGS based on the Drawbacks subscale.

No.	Items	Student GPA
11	It could negatively affect future job opportunities.	0.09**
12	It could negatively affect admission to graduate studies programs.	0.10**
13	It could negatively affect admission to university scholarships.	0.10**
14	It may adversely affect granting students' academic discounts.	0.10**
15	Makes the student feel that their true performance is no longer important.	0.11**
16	It makes the student satisfied only with the minimum to pass.	0.08**
17	It leads to laxity of the student when he knows that his evaluation will be on the basis of success/failure.	0.11**
18	Students are encouraged not to attend lectures and participate.	0.06*
19	It gives a feeling of frustration because everyone will receive the same recognition, regardless of their level of understanding of the content.	0.15**
20	This option indicates that the student studied the subject but does not indicate exactly the strengths of the student.	0.12**
	Drawbacks of PFGS	**0.13****

*Significant at 0.05. **Significant at 0.01.

TABLE 17 Spearman correlation coefficient between the GPA and students' perspectives on the PFGS based on the Reasons subscale.

No.	Items	Student GPA
21	To overcome the problem of difficult exams.	−0.03
22	To bypass the return of the article.	−0.08**
23	Because the material is tough and it is not easy to get a high mark in it.	−0.06**
24	In order to raise or maintain his GPA.	−0.02
25	Because of the one-way system, which negatively affected students' results.	−0.03
26	Because he has passed through personal circumstances such as illness or sick care, which prevent him from preparing well for exams.	−0.06
27	Because of his lack of electronic capabilities that make him abide by the lectures.	−0.04
28	Because of an emergency electronic defect while taking the exams remotely.	0.03
29	To get rid of the warning penalty resulting from a low GPA.	−0.14**
30	To overcome the difficulty of moving from face-to-face learning and assessment to remote learning and evaluation.	−0.04
	Reasons for using PFGS	**−0.09****

**Significant at 0.01.

TABLE 18 Spearman correlation coefficient between the GPA and students' perspectives of the PFGS based on the Attitudes subscale.

No.	Items	Student GPA
31	My prior knowledge with a pass/fail decision made me receive the content of the materials comfortably and without psychological pressure, and I would benefit more scientifically.	−0.06*
32	I have no objection to the appearance of a pass/fail option in my final score sheet with the result.	−0.06*
33	I believe that monitoring the course results with a pass/fail option is always in the best interest of the student.	−0.16**
34	I believe that monitoring the material results with a pass/fail option is appropriate for all subjects without exception.	−0.19**
35	I am in favor of applying the pass/fail option for grading results even if the education returns to the face on campus.	−0.17**
36	I am confident that selecting pass/fail will increase my GPA.	−0.06*
37	In my opinion, the possibility of converting my result to pass/fail made me increase the number of courses registered.	−0.12**
	Attitudes toward PFGS	**−0.20****

*Significant at 0.05. **Significant at 0.01.

When we look at the frequency percentages, we can see that most participants' responses were either "disagree" or "strongly disagree" for all questions.

For example, the highest percentage value of 73.7% of the respondents' answers fell into these two answers ("disagree" and "strongly disagree") for Question 18. Only 26.36% (8.89% + 9.87% + 7.6%) had other answers.

As for the Reasons subscale for selecting the PFGS, the frequencies, mean scores, and standard deviations of the scores obtained from the answers of the study subjects were extracted and are shown in Table 8.

As shown in Table 8, the mean for all questions ranged from 3.83 to 4.47 for the Reasons subscale, with an overall mean of 4.16. Based on this GAW value, all items were agreed upon among the students.

When we look at frequency percentages, we can see that the majority of participants' responses were either "agree" or "strongly agree" for all the questions under the Reasons subscale.

As for the Attitudes toward the PFGS subscale, the frequencies, mean scores, and standard deviations of the scores obtained from the answers of the study subjects were extracted and are shown in **Table 9**.

For example, the highest percentage value of 77.4% of the respondents' answers fell into these two options ("agree" and "strongly agree") for Question 31. Only 22.67% (4.4% + 5.78% + 12.49%) had other answers.

To answer the second question: Are there any significant differences at* α *= 0.05 in students' perspectives of the PFGS attributed to gender?

According to Peers (2006), if a response variable is normally distributed and is measured for two independent samples of individuals, then an independent t-test can be conducted to test whether there is any statistically significant difference between the means for these two samples. As the normality of the data is violated, a non-parametric analysis, the means, and the standard deviations of the scores on each of the four subscales were calculated separately based on the ***gender*** of the subjects. Then, the Mann-Whitney U test for the independent groups was conducted. The results are shown in **Table 10**.

From **Table 10**, it can be seen that there are significant differences at α = 0.05 in the Drawbacks and Reasons subscales that can be attributed to gender. The differences are in favor of females for both Drawbacks (Z = −5.75, *p*-value < 0.001), and Reasons (Z = −3.37, *p*-value < 0.001).

Hence, there are significant differences in the students' perspectives of the PFGS regarding the Drawbacks and Reasons attributed to gender and in favor of females. For the Advantages and Attitudes subscales, there are no significant differences at* α *= 0.05. However, the effect size (Z/) was calculated as shown in **Table 10**. It indicated a very small effect size according to Cohen's rules, although there was a statistically significant effect of sex.

To answer the third question: Are there any significant differences at* α *= 0.05 in the students' perspectives of the PFGS attributed to the school category?

According to Pagano (2012), the analysis of variance is a statistical technique used to analyze multi-group experiments. Using the F-test allows researchers to make one overall comparison that indicates whether there is a significant difference between the means of the groups. As the normality of the data is violated, a non-parametric analysis, K–W test was run to examine if there were differences between the three types of schools on the students' perspectives of the PFGS. **Table 11** shows the results of the analysis.

As indicated in **Table 11**, we can see that the difference was significant for the Advantages and Attitudes subscales, with K–W = 17.03, and 43.43, respectively, at a *p*-value < 0.001.

As the K-W values are significant, it can be concluded that there are significant *differences at* α *= 0.05 in the students' perspectives of the PFGS attributed to the school category*.

Based on the results recorded in **Table 12**, Pairwise Comparisons of school type were used as a *post-hoc* analysis to identify the pairwise significance of differences in the advantages and attitudes subscales. Significance values have been adjusted by the Bonferroni correction for multiple tests. Results are tabulated in **Table 12**.

Table 12 shows that all pairwise comparisons in the advantages subscale were significant, while one comparison is significant in the attitude subscale (Medical-Humanities). Thus, it can be concluded that humanities schools caused significant differences in students'

perspectives toward using the PFGS when compared with other schools. Effect size using the eta squared statistic was calculated (H-k + 1)/(n-k), as shown in **Table 10**. It indicated a very small effect size according to Cohen's rules, although there was a statistically significant effect of the school category.

To answer the fourth question: Are there any significant differences at* α *= 0.05 in students' perspectives of using the PFGS attributed to academic level?, the mean and the standard deviations of scores for each of the subscales were calculated according to the academic level of the participants, and then Kruskal-Wallis Test was conducted to analyze the differences in students' perspectives of the PFGS attributed to ***academic level***. **Table 11** shows the results of the analysis.

It is noted that the mean ranks were significant for the Advantages and Drawbacks subscales, with K-W = 28.15 and 52.58, respectively, at *p* < 0.001.

Based on the results recorded in **Table 13**, pairwise comparisons of the academic level were used as a *post-hoc* analysis to identify the pairwise significance of differences in the Advantages and Drawbacks subscales. Significance values have been adjusted by the Bonferroni correction for multiple tests. Results are tabulated in **Table 14**.

Table 14 shows that the following pairwise comparisons in the advantages subscale were significant: Sophomore – Freshman, Junior – Freshman, while the significant pairwise comparisons in the drawback subscale were (Senior – Sophomore, Senior – Freshman, Junior – Sophomore, and Junior - Freshman). Effect size using the eta squared statistic was calculated (H-k + 1)/(n-k), as shown in **Table 13**. It indicated a very small effect size according to Cohen's rules, although there is a statistically significant effect on the academic level.

To answer the fifth question: Is there any significant correlation at* α *= 0.05 between GPA and students' perspectives of the PFGS?, the Spearman correlation coefficient (r) was used to correlate the scores between students' GPA and their perspectives on the PFGS. **Tables 15–18** show the results for the four subscales.

As can be seen in **Table 15**, the Spearman correlation coefficients ranged from 0.01 to 0.15 for the Advantages subscale. Although these are weak, they indicate a negative significant correlation. The scatter plot in **Supplementary Appendix F** shows a decreasing relationship. It shows that as the GPA of students increases, their perceptions about PFGS advantages decrease. The determination coefficients for all these Spearman correlation coefficients were also weak, ranging between 0.00 and 0.03. The values indicate a very low explained variance between these two variables.

For the Drawbacks subscale, **Table 16** shows that Spearman correlation coefficients range from 0.06 to 0.15. Although these values are also weak, they indicate a positive significant correlation. The scatter plot in **Supplementary Appendix G** shows an increasing relationship. It shows that as the GPA of students increases, their perceptions about PFGS Drawbacks increase. The determination coefficients for all these Spearman correlation coefficients were also weak, ranging between 0.00 and 0.02. The values indicate a very low explained variance between these two variables.

For the Reason subscale (see **Table 17**), Pearson correlation coefficients ranged from 0.02 to 0.14, which indicates a negative significant correlation. The scatter plot in **Supplementary Appendix H** shows a decreasing relationship. It shows that as the

GPA of students increases, their perceptions about PFGS reasons decrease. The determination coefficients for all these Pearson correlation coefficients were also weak, ranging between 0.00 and 0.02. The values indicate a very low explained variance between these two variables.

For the Attitudes subscale (see **Table 18**), Spearman correlation coefficients ranged from 0.06 to 0.19, indicating a negative significant correlation. The scatter plot in **Supplementary Appendix I** shows a decreasing relationship. It shows that as the GPA of students increases, their attitudes toward PFGS decrease. The determination coefficients for all these Spearman correlation coefficients were also weak, ranging between 0.00 and 0.04. The values indicate a very low explained variance between these two variables.

In summary, with regard to the relationship between students' GPA and their perspectives on the PFGS, the correlation coefficients indicated a weak but significant correlation. The correlation values were negative between GPA and Advantages, Reasons, and Attitudes, but positive between GPA and Drawbacks. This could be attributed to the finding that the higher the GPA, the lower the approval on these subscales. In the Drawbacks subscale, the correlation was positive.

5. Discussion of limitations and recommendations

This study was conducted during the COVID-19 pandemic in the second semester of the 2020/2021 Academic Year. It was limited to undergraduate students at four government universities in different places in Jordan. However, we think that the results we achieved could be valid for postgraduate students as well, this is due to the fact that all levels of students faced the same circumstances during the COVOD-19 pandemic.

In addition, this study utilized a cross-sectional online survey that was conducted among the students' population. The survey was developed to evaluate the students' perspectives about the PFGS option during online learning. Therefore, some limitations involving cross-sectional data collection were encountered, which inevitably restricted the generalizability of the study outcomes. Future studies could gather qualitative data for a deeper understanding of these perspectives. This study relied on three categorical variables to compare students' perspectives: sex, school type, and academic level. As such, future studies should incorporate more personal variables that may influence perspectives on the PFGS option.

From another perspective other than students; we felt that the instructors were agreeing on the results achieved in this study as they were very close to students during the pandemic, chatting at almost all times.

On the other hand, we believe that adding a set of long-term procedures will help avoid any unexpected panic. As such, adding a set of quality assurance procedures for current and future pandemic scenarios will be helpful, i.e., solutions to problems should not be temporary; instead, they should be permanent. In other words, whenever possible, academic institutes should always be proactive, not only reactive.

In academic environments where students are the main clients, we believe that students should be part of making proper decisions. We did our best in this research to present the most important factors affecting the PFGS, even though there might be other ones. Our recommendations are as follows:

1. Set clear criteria and principles for using the PFGS if the intention is to continue using it.
2. Activate student counseling programs to educate students about the conditions that may affect the success and failure system
3. Limit the number of pass/fail credits students can apply toward their degree.
4. Create awareness among students regarding the advantages and drawbacks of this system and the difficulties that may prevent it from being implemented by universities.
5. Conduct further studies on the factors affecting the use of this system.

6. Conclusion

In a sample of 6,404 bachelor's degree students who were enrolled in four Jordanian universities during the 2020/2021 Academic Year, a questionnaire for evaluating students' feedback about the PFGS was applied. In its final version, the questionnaire consisted of 37 questions distributed among four subscales, and 6,141 valid responses were collected. The study seeks to fulfill the following aims: assess students' perspectives about the PFGS; see the effect of students' gender on their perspectives about PFGS; assess the effect of students' school categories on their perspectives about the PFGS; assess the effect of students' academic level on their perspectives about the PFGS; and assess the relationship between students' GPA and their perspectives about the PFGS.

The results showed that students agreed with all items of the Advantages subscale (except for one item), the Reasons subscale, and the Attitudes subscale, while students disagreed with all items of the Drawbacks subscale. The majority of participants answered "agree" and "strongly agree" for all questions of the Advantages, Reasons, and Attitudes subscales. On the other hand, the majority of participants answered "disagree" and "strongly disagree" for all questions of the Drawbacks subscale. These results could be attributed to the students' beliefs that they either need to return to the university campus to receive a direct and quality education or should be offered the PFGS as an option so that their cumulative average will not be negatively affected by the inability of the university to provide suitable e-learning services for them and the absence of adequate e-learning tools for many of them. They requested to use the PFGS because their exams were online and distance learning, in its current form, is unfair according to their opinions, and they face limitations of direct communication with their university professors. They indicated that 100% of their lectures were conducted through distance learning.

The results also showed that there were significant differences at $\alpha = 0.05$ in some of the subscales of students' perspectives on the PFGS attributed to gender, school category, and academic level. Female scores were higher than male scores in the Drawbacks

and Reasons subscales. On the other hand, humanities students showed a higher degree of agreement ("agree") regarding the PFGS compared to those in medicine. This could be attributed to the fact that medical students think that the PFGS is an unacceptable choice, as it has an impact on school accreditation and prevents them from exercising their right to have their grades calculated and considered.

The results also indicated that freshman students showed a higher degree of agreement toward applying the PFGS compared to sophomore, junior, and senior students. This could be attributed to their interest in getting higher cumulative averages and their fear of getting low GPAs, which are factors that will affect them in the future. It seemed that students with higher levels of cognitive and emotional development were more aware of their perceptions of academic issues compared to the freshman and sophomore students. Perhaps students at the later academic levels (junior and senior students) possessed a more realistic view of the academic options and the impact of these options on their future and their working lives.

Regarding the relationship between GPA and students' perspectives on the PFGS, it was clear that the correlation coefficients indicated weak but significant correlations. The correlation values were negative between GPA and Advantages, Reasons, and Attitudes, but positive between GPA and Drawbacks, which could be attributed to our finding that students with higher GPAs gave lower approval on these subscales.

Data availability statement

The original contributions presented in this study are included in the article/**Supplementary material**, further inquiries can be directed to the corresponding author.

Author contributions

RA-S conceptualized basic idea, designed the questionnaire, designed the method, analyzed the results, and wrote the manuscript. FA designed the questionnaire, designed the method, analyzed the results, and wrote the manuscript. MI, DS, SA, and AA collected data and literature review and wrote the manuscript. All authors contributed to the article and approved the submitted version.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supplementary material

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/feduc.2023.1186535/full#supplementary-material

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