

ПСИХОЛОГИЧЕСКИЕ ИССЛЕДОВАНИЯ В ОБРАЗОВАНИИ

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PERCEPTION OF UNIVERSITY STUDENTS ON THE ROLE OF EDUCATIONAL DIGITAL STIMULI IN ACHIEVING ACADEMIC PASSION IN VOCATIONAL EDUCATION

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Abstract. *Introduction.* Digital stimuli are one of the strategies prepared by higher education institutions in university teaching in the field of vocational education, but they do not attach importance to them from other strategies that are used. The investigation of the role of educational digital stimuli

in achieving the academic passion of vocational education students in Jordanian universities in light of COVID-19 is important to try to know the effect of digital stimuli on the academic passion of vocational education students.

Methodology and research methods. The descriptive survey method was used to analyse the data. To achieve the objectives of the study, a questionnaire consisting of (29) items was designed, divided into three areas: dynamics (11 items), mechanics (7 items), and components (11 items) to collect data. The study sample consisted of 260 male and female students in Jordanian universities.

Results and scientific novelty. The results showed that the role of educational digital stimuli in achieving academic passion was 'high' with no statistically significant differences due to the gender variable, with statistically significant differences due to the variables of the academic year and university type.

Practical significance. The study recommends designing educational environments that are attractive, interactive, and related to the students' reality, using strategies for deep information processing, problem-solving method, creativity and critical thinking in order to achieve students' involvement in learning.

Keywords: digital stimuli, academic passion, vocational education, students' perception.

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ВОСПРИЯТИЕ СТУДЕНТАМИ ВУЗОВ РОЛИ ОБРАЗОВАТЕЛЬНЫХ ЦИФРОВЫХ СТИМУЛОВ В ПОБУЖДЕНИИ К АКАДЕМИЧЕСКОЙ ВОВЛЕЧЕННОСТИ В ПРОФЕССИОНАЛЬНОМ ОБРАЗОВАНИИ

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Аннотация. *Введение.* Цифровые стимулы являются одной из стратегий, подготовленных высшими учебными заведениями в университетском обучении в сфере профессионального образования, но университеты не выделяют их из других стратегий, которые используются. Исследование роли и влияния образовательных цифровых стимулов в достижении академической вовлеченности у студентов профессионального образования в иорданских университетах в свете COVID-19 важно.

Методология и методы исследования. Для анализа данных использовался описательный метод опроса. Для достижения целей исследования была разработана анкета для сбора данных, состоящая из 29 пунктов, разделенных на три области: динамика (11 пунктов), механика (7 пунктов) и компоненты (11 пунктов). Выборка исследования состояла из 260 студентов мужского и женского пола в иорданских университетах.

Результаты. Результаты показали, что роль образовательных цифровых стимулов в достижении академической вовлеченности была высокой без статистически значимых различий из-за гендерной переменной, со статистически значимыми различиями из-за переменных «учебный год» и «тип университета».

Практическая значимость. Даны рекомендации создавать привлекательную, интерактивную и связанную с реальностью учащихся образовательную среду, используя стратегии глубокой обработки информации, метод решения проблем, креативность и критическое мышление, чтобы добиться вовлечения учащихся в процесс обучения.

Ключевые слова: цифровые стимулы, академическая вовлеченность, профессиональное образование, восприятие студентов.

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PERCEPCIÓN POR PARTE DE LOS ESTUDIANTES UNIVERSITARIOS DEL PAPEL QUE JUEGAN LOS INCENTIVOS EDUCATIVOS COMO FOMENTO HACIA EL COMPROMISO ACADÉMICO EN LA FORMACIÓN PROFESIONAL

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Abstracto. Introducción. Los incentivos digitales son una de las estrategias que elaboran las instituciones de educación superior en la formación universitaria en la esfera de la formación profesional, pero las universidades no los resaltan de otras estrategias que son utilizadas. Es importante investigar el papel y el impacto de los incentivos digitales educativos para lograr el compromiso académico entre los estudiantes de formación profesional en las universidades jordanas a la luz de la COVID-19.

Metodología, métodos y procesos de investigación. Para el análisis de los datos se utilizó el método de encuesta descriptivo. A fin de lograr los objetivos del estudio, se elaboró un cuestionario de recolección de datos, compuesto por 29 ítems, divididos en tres áreas: dinámica (11 ítems), mecánica (7 ítems) y componentes (11 ítems). La muestra del estudio estuvo conformada por 260 estudiantes entre hombres y mujeres de las universidades jordanas.

Resultado. Los resultados mostraron que el papel de los incentivos digitales educativos en el logro del compromiso académico fue alto, sin diferencias estadísticamente significativas en relación a la variable del tipo sexo de los encuestados, con diferencias estadísticamente significativas respecto las variables “año académico” y “tipo de universidad”.

Significado práctico. Se dan recomendaciones para crear un entorno de aprendizaje atractivo, interactivo y relevante para los estudiantes utilizando estrategias profundas de procesamiento de información, resolución de problemas, creatividad y pensamiento crítico con el propósito de involucrar a los estudiantes en el proceso de aprendizaje.

Palabras claves: estímulos digitales, compromiso académico, formación profesional, percepción de los estudiantes.

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Introduction

Presently, university education is facing numerous challenges and changes, and among these changes is what the global pandemic COVID-19 caused in student learning patterns. Since the transition has been made from traditional education for most students, e-learning has become a new trend for university students. This circumstantial context during unexpected environmental changes has created a gap in a conducive process/environment for promoting effective learning. Universities have a responsibility of creating a learning environment conducive to promoting effective learning. The development of models and measures that enhance students' participation in learning is critical to improving their learning [1]. The more engaged they are in learning, the more excited they are to learn and make more progress. Students have psychological components of feelings, moods, emotions, or situations in response to stimuli in their environment, thus, linking educational participation in e-learning with the e-learning environment may bring about psychological changes in them towards different learning styles and interactive behaviours. Therefore, positive psychology was interested in studying the factors that make students' lives more prosperous with positive meanings and that deserve perseverance in order to achieve them, and live for them. Among these factors are academic passion, perseverance and flow, as they are linked to positive practices and outcomes such as commitment to hard work, achievement goals, and learning for mastery [2].

Literature Review

The passionate student engages in the activity, not just for performance, but for mastery, excellence, creativity, and reaching a state of inner satisfaction. Vallerand R. et al. [3] see that passion is what drives and motivates us towards performing an activity; it is the motive that lies behind performing a behaviour, or dedication and enthusiasm towards a particular object, activity, concept or person. Vallerand R. et al. [3] have developed the Dualistic Model of Passion (DMP) which is based on the Self-Determination Theory. In the model, there are three main needs that must be satisfied in an individual, namely: autonomy, competence, and relatedness. Accord-

ing to this model, passion for an activity is related to the interaction between the activity, the individual, and the environment because the student is more likely to become passionate if he/she is allowed to satisfy basic psychological needs theory within the environment. He/She may participate in many activities, with the aim of satisfying his/her basic psychological needs, which are basic structures that the student needs to feel motivated towards behaviour [4]. The methods students use in receiving and processing academic content influence their passion and how they engage with their studies [5], since digital stimuli are in fact digital rewards: audio motivational messages, motivational items in digital learning resources, digital “rewards” in the form of the possibility to work across Internet on a particular service, etc. Also, it means employing these games in educational situations In order to motivate and excite students towards the implementation of learning tasks [6]. Designing educational programmes based on digital stimuli means that these programmes include objectives, content, procedures, strategies, and learning activities that students are motivated to interact with, and implement them using stimuli only, within a framework of non-play-based structural procedures [7]. Student, in his/her quest to achieve the objectives of the educational programme, and the implementation of each task in that programme, is linked to predetermined motivational elements that he/she obtains immediately upon his/her implementation of each task according to clear criteria that determine the amount of his/her entitlement to the stimulus, for example, the number of points obtained by each student varies according to the level of its implementation of learning tasks [8]. At this juncture, it must be emphasised that education based on digital stimulation does not depend on a specific game, but some elements and principles of games are employed within educational activities and tasks with the aim of motivating students, and rewarding them to ensure that they maintain a high and continuous level of motivation [9]. In this context, digital stimuli are defined as the use of game features and elements in educational settings that are not based on play, with the aim of adding fun and motivation to educational environments, and getting some of them out of monotony and stereotypedness to the idea of enjoying various learning events [10]. Digital stimuli include a large number of elements that can be relied upon in the development of educational programmes, and the most commonly used models of digital stimuli in educational environments can be referred to as follows:

1. *Point* is a numerical representation that expresses the learner’s achievements in carrying out the tasks assigned to him/her. They act as strong motivators for learners. The learner gets points cumulatively in his/her pursuit of learning tasks. Points give the learner a sense that he/she always earns according to his/her performance [11].

2. *Badge* is a visual representation of the learner’s achievements. Badges represent a document of recognition of the learner’s efforts in achieving the various learning objectives [12].

3. *Levels* indicate moving from one category to another, or from one level to another based on the learner’s progress in the educational tasks and his/her

achievement of goals that qualify him/her to join a higher level that requires new challenges. Level is considered an actual translation of the learner's progress in accomplishing learning tasks [8].

4. *Leaderboard* is a visual representation that shows the ranking of learners compared to each other based on their progress in carrying out the learning tasks [13].

5. *Progress bar* is a visual representation that determines the learner's completion of the learning stages and tasks, as required by the educational programme [14].

These stimuli are used to motivate and reward students in order to maintain a high and continuous level of motivation [9]. Within the framework of the theories that establish the use of digital stimuli in educational programmes, it is possible to refer to the self-determination theory, which indicates that the student's drive towards the implementation of tasks is motivated by a set of internal motives. The higher the level of the internal motives, the more the student becomes able to decide his/her own destiny and his/her actions. Thus, the internal motives lead to the practice of behaviours that make the student to have feeling of pleasure and satisfaction, regardless of whether he/she receives rewards or not. The theory is based on the assumption that man is dialectical and innately oriented, but this innate orientation does not work in an automatic way because it requires support and appropriate reactions from the social environment. This is what digital stimuli can do, as it stimulates and arouses the motivation of the individual in order to show his/her capabilities and skills [4, 15].

Therefore, the importance of academic passion, according to what was mentioned by Buckley P. & Doyle E. [10], is that it motivates students to persevere and devote themselves to learning activities and tasks, and engage them in these activities, and efficiently face academic pressures and difficulties. It generates with them high levels of commitment and continuous positive practices necessary to achieve excellence and creativity, and then it is linked to positive academic outcomes, and positively affects the student's sense of happiness, academic well-being, and study satisfaction. It is also associated with lower levels of academic burn-out. It can be said that academic passion is one of the important things that motivates students to continue learning, searching for information, and employing it. Learning from their point of view is to understand life, not just for tests. It also includes an emotional component represented in a strong inclination and a strong desire to study. A cognitive component represented by the individual's awareness of the importance, value and significance of the study, and a behavioural component represented in the individual's investment of time, effort and perseverance in order to master performance and creativity in it [16]. Lee Y. et al. [17] added that passion develops students' positive attitudes towards the learning environment, and thus affects their adaptation to the study environment, which is reflected in their success and achievement of their goals.

Based on the foregoing, the use of digital stimuli in educational curricula achieves harmonisation between the intrinsic and extrinsic motives of the student to obtain better performance with the availability of appropriate tools to bring about positive changes in behaviour, and the possibility of designing educational applica-

tions that achieve more effective engagement. The main objective of these stimuli is to motivate students to learn the available information as best they can [9].

Previous studies have indicated interest in the topic of digital stimuli and their role in achieving academic passion. In Canada, the study by Alexandru I. & Dick E. [18] revealed that digital game stimuli helped to attract students' attention, increase their participation in students' attention, and increase their participation in unusual activities, and challenging tasks by teaching with technology that uses elements of social games.

In England, Doney I. [19] investigated effective gamification features to inform e-learning design by analysing current research to identify some of the main approaches and pedagogical factors that make learning through educational games effective and attractive in order to create a list of features that can be used to enrich the inclusion of gamification elements in e-learning activities. The results of the study concluded that digital game stimuli help to develop design skills, especially in the field of e-learning, which is consistent with website design skills, as it includes a set of stimuli for motives that develop knowledge and skills for design.

Schellenberg B. et al. [20] examined the extent to which academic passion is affected by age and study progress. The results of the study showed that the level of academic passion changes and develops among students as they progress in studies.

The study by Bélanger C. & Ratelle C. F. [21] aimed at identifying the features of passion and comparing students' academic performance. The results of the study showed that the latent profile had four profiles: high (harmonious emotions and high obsessive), moderate (moderate harmonious, obsessive passions), low (harmonious low obsessive passion) and ideal (high harmonious passion and low obsessive passion) in the sample of 460 undergraduate students. In general, highly motivated students (high and idealistic profiles) reported the most positive indicators of academic performance while students at the low level showed the worst levels of academic performance.

Chen C. M. et al. [22] aimed at identifying the development of a participatory reading subversion system based on digital stimuli to encourage students to subdue what they are reading. The results of the study found the effectiveness of digital stimuli in enhancing the performance of learners related to the quality of their participation in the process of overcoming based on reading comprehension.

The research by C. M. Chen et al. [23] aimed to design a mobile learning environment based on digital game stimuli to develop electronic participation skills and achievement motivation among middle school students. The results of the study found that there were statistically significant differences between the two experimental groups in (electronic participation scale, achievement motivation scale, and achievement test) in favour of the second experimental group.

Alhalafawy W. S. et al. [24] examined the relationship between educational programmes based on digital stimuli, motivation for academic achievement and the need for knowledge among middle school students in the sciences course. The results also demonstrated the effectiveness of digital stimuli in developing motivation

for academic achievement and the need for knowledge in comparison with non-motivational platforms.

Al-Dhabu' F. [25] aimed to identify the level of academic passion in light of the binary model among students of the master's programme in Special Education at King Khalid University in Saudi Arabia, according to some demographic variables. The results of the study showed that the level of academic passion and harmonic passion was high, while the level of compulsive passion was medium. There were statistically significant differences in harmonious passion in favour of females and workers in special education institutions and students at the third level, compared to males, non-workers and students at the first level while there were no differences due to the system studying. The results showed that there were statistically significant differences in the compulsive passion according to the difference of the study system in the direction of the course system, and the differences in the compulsive passion according to gender, job status and academic level did not reach the level of statistical significance. There were differences in academic passion due to academic track.

Problem statement

The outbreak of COVID-19 virus in the world influenced all aspects of life. Since higher education institutions do not operate in isolation from what is happening in the world, this pandemic has imposed major transformations and changes that posed a great challenge to university instructors, which is reflected in the students' psyche and their academic passion. Therefore, strategies that achieve their academic passion have become indispensable. After reviewing relevant previous studies, most researchers agreed that there are factors that affect academic attitudes on the one hand, and learning outcomes on the other. The problem of the study was represented by the presence of factors affecting the students' academic passion and this in turn affects their choice of the activities they wish to participate in and the nature of the academic goals they seek to achieve [26].

Study questions:

1. What is the perception of students on the role of educational digital stimuli in achieving the academic passion of vocational education students in Jordanian universities in light of the COVID-19 pandemic?
2. Are there statistically significant differences at the level ($\alpha = 0.05$) between the average estimates of the responses of the study sample to the role of educational digital stimuli in achieving academic passion among vocational education students in Jordanian universities due to the variables of gender, academic year and university type?

The significance of the study

The importance of digital incentives varies in the following matters:

The importance of the study lies in the scarcity of studies in the Arab environment and the Jordanian environment, especially on the topic of the role of

digital stimuli in achieving academic passion. It also gains its importance from of the topic. Researchers in the field of education believe that digital stimuli are a basis for creating a kind of excitement and a state of activity in the hearts of students with the aim of raising their knowledge levels, motivating them to complete the tasks assigned to them, and creating a state of honest competition between students to improve what they learn at each educational stage.

The limitation of the study

The study was limited to achieve the following:

1. *Objective limits*: The study was limited to the topic of the role of educational digital stimuli in achieving the academic passion of vocational education students in the Jordanian universities in light of the COVID-19 pandemic.
2. *Time limits*: The study was implemented in the first semester of the 2021/2022 school year.
3. *Spatial limits*: The study was conducted in public and private universities in Jordan.
4. *Human limits*: This study was applied to a sample of vocational education students.

Definition of terms

- *Digital stimuli* are the integration and application of game elements and principles to motivate vocational education students to achieve their academic passion. These stimuli were measured through a five-step questionnaire, which sought to understand the role of digital stimuli in developing academic passion among vocational education students.
- *Academic passion* is a strong love and fondness of students towards their specialisation, as it makes them enthusiastic about the subjects they study and spend time and effort for it.

Methodology

This study used the survey descriptive research method, where the study data were collected through a questionnaire. The study included the main independent variable, represented by the role of educational digital stimuli in achieving the academic passion of vocational education students from the students' point of view. As for the median independent variables, they included the variable of gender, year of study, in addition to the variable of university type. As for the dependent variables, it included the study sample responses to the tool.

The population and sample of the study

The study population consisted of 283 vocational education students in Jordanian universities in the first semester 2021/2022. The study sample consisted of 260 students who were chosen randomly. Table 1 displays the demographic features of the sample members.

Table 1

Sample’s demographic features

	Categories	Frequency	Percentage
Gender	Male	65	25.0
	Feminine	195	75.0
Academic year	First	52	20.0
	Second	108	41.5
	Third	43	16.5
	Fourth	57	21.9
	Government	185	71.2
University type	Private	75	28.8
	Total	260	100.0

Study tool

The role of educational digital stimuli in achieving academic passion among vocational education students has been prepared by reviewing the theoretical and research literature [5, 21, 22, 27, 28, 29–31], which is related to the role of digital stimuli in achieving academic passion among vocational education students. The opinions of experts researching in the field of vocational education, educational technology and psychology were surveyed to identify their experience in determining the effectiveness of digital stimuli that require adoption as a result of different psychological conditions, crises, and perspectives. A questionnaire consisted of 29 items distributed on three main domains: dynamics, mechanics, and components were built.

The validity of the study tool

To identify the appropriateness of the questionnaire of teaching practices for the applications of constructivist philosophy in the educational learning process, it was presented to 9 reviewers, who are experts in vocational education, curricula, teaching methods, educational principles, educational administration, psychology, measurement and evaluation from Yarmouk University, the University of Jordan and the Hashemite University. The reviewers expressed their opinions on the accuracy and validity of the content in terms of clarity of the items, the linguistic formulation, their suitability to measure what they were designed for, the affiliation of the items to the domain to which they belong, and the addition, modification or deletion of what they deem appropriate on the items. All the reviewers’ comments were taken based on the approval of 80% of them, as the language of some items was modified, such as the second item in the first domain “Digital stimuli meet some basic human needs, such as recognition, reward, achievement, competition, cooperation, self-expression and altruism” which became “Digital stimuli satisfy some basic human needs, such as appreciation, reward, achievement, competition, cooperation, self-expression, and altruism”.

And the third item in the first domain, “Digital stimuli contribute to helping students master learning levels by grading them according to the level of difficulty” has been modified to “Digital stimuli contribute to mastering learning levels by

grading them according to the level of difficulty”. And 27 items retaining without modification, as the number of items of the tool in its final form became 29 items distributed over three domains, namely: dynamics with eleven items, mechanics with seven items, and components with eleven items. The five-step Likert scale was adopted which reads as follows: very high, high, medium, low and very low in which each level was given (5, 4, 3, 2, 1) respectively.

Study tool stability

To ensure stability, the test-retest method was verified by applying the questionnaire, and re-applying it after two weeks on a group from outside the study sample consisting of 30 students. And then Pearson correlation coefficient was calculated between their estimates in both times, which reached 0.86 between the two applications. The stability coefficient was also calculated using the internal consistency method according to Cronbach’s alpha equation, which reached 0.80. All of these values are acceptable and give a positive indication of the tool reliability.

Results

The results are displayed according to the research questions as follows:
RQ1. What is the perception of students on the role of educational digital stimuli in achieving the academic passion of vocational education students in the Jordanian universities in light of COVID-19?

In order to answer this question, the means and standard deviations of the role of educational digital stimuli in achieving academic passion were extracted from the viewpoint of vocational education students in universities in the Jordanian universities under the COVID-19, as illustrated in Table 2.

Table 2
Means and SD of the role of educational digital stimuli in achieving academic passion

Rank	No.	Domain	Means	SD	Level
1	3	Components	3.81	.619	High
2	1	Dynamics	3.79	.633	High
3	2	Mechanics	3.76	.700	High
		Stimuli as a whole	3.79	.617	High

Table 2 shows that the means for the role of educational digital stimuli in achieving academic passion from the point of view of vocational education students in the universities of the northern region under COVID-19 ranged between 3.76–3.81, where the components domain was ranked first with the highest mean of 3.81, the “mechanics” came in the last rank, with a mean of 3.76, and the mean of the tool as a whole was 3.79, i.e. a high degree of estimation. The means and standard deviations of the study sample estimates were calculated on the items of each domain separately, as they were as follows:

The dynamics

The means and standard deviations of the role of educational digital stimuli in achieving academic passion from the point of view of vocational education students in universities in the Jordanian universities under COVID-19 in the domain of dynamics, for each item of the domain are presented in Table 3.

Table 3

The means and standard deviations related to the dynamics

Rank	No.	Items	Means	SD	Level
1	1	Digital stimuli develop in students passion (challenge, curiosity, control, creativity).	3.85	.784	High
1	2	Digital stimuli satisfy some basic human needs, such as appreciation, reward, achievement, competition, cooperation, self-expression, and altruism.	3.85	.911	High
1	4	Digital stimuli allow for trial and error in students' performance without feeling rejected, which motivates them to perform more efforts and attempts to advance in learning levels and win points, and medals.	3.85	.853	High
4	7	Digital stimuli help students and their colleagues interact in the learning environment in meaningful ways.	3.84	.844	High
5	9	Digital stimuli create meaningful experiences for students through fun, joy.	3.83	.791	High
6	8	Digital stimuli satisfy students' innate needs for self-esteem by making them aware of the importance of their accomplishments.	3.80	.852	High
7	6	Digital stimuli encourage students to access knowledge in their own way by searching for detailed information.	3.79	.793	High
8	10	Digital stimuli provide students with opportunities to experiment with rules, emotions, and social roles.	3.75	.895	High
9	3	Digital stimuli help students master learning levels by grading them according to the level of difficulty.	3.73	.856	High
10	11	Digital stimuli integrate students into the learning process through educational contexts in a way (interesting, fun) away from material rewards.	3.71	.861	High
11	5	Digital stimuli inspire students and constantly motivate them for lifelong learning.	3.70	.866	High
		Dynamics	3.79	.633	High

Table 3 shows that the means for the role of educational digital stimuli in achieving academic passion from the point of view of vocational education students in universities under COVID-19 in the domain of dynamics ranged between 3.70–3.85. Item 1 which states that “Digital stimuli develop in students a passion (challenge, curiosity, control, and creativity)”; item 2 which states that “Digital stimuli meet some basic human needs, such as (recognition, reward, achievement, competition, cooperation, self-expression, and altruism)”; and item 4 which states that “Digital stimuli provide the opportunity to try and make mistakes in the performance of students without feeling rejected, which motivates them to perform more effort and attempts to advance in learning levels and win (points, and medals)” were all ranked first with a mean of 3.85. Item 5, which states that “digital stimuli act as inspiration for students as they continuously motivate them for lifelong learning”, came in the

last rank with a mean of 3.70. The mean of the dynamics as a whole was 3.79. This means that there were no distinct standard degrees in the role of educational digital stimuli in achieving academic passion from the point of view of students of vocational education in universities in the domain of dynamics.

The mechanics

The means and standard deviations of the role of educational digital stimuli in achieving academic passion from the point of view of vocational education students in universities in the northern region under COVID-19 in the domain of mechanics, and for each item of the domain as presented in Table 4.

Table 4

Means and SD related to mechanics

Rank	No.	Item	Means	SD	Level
1	17	Digital stimuli form a winning strategy that achieves fun, joy for students.	3.89	.803	High
2	16	Digital stimuli enable students to pass educational activities through challenge and perseverance.	3.85	.881	High
3	14	Digital stimuli invest students' energies by engaging in the performance of graduated tasks in challenges and levels of learning.	3.80	.879	High
4	13	Digital stimuli create positive motives for students towards achieving excellence, and winning.	3.77	.815	High
5	12	Digital stimuli provide feedback to students by rewarding them for their correct answers with points, and exceptional medals.	3.73	.893	High
6	18	Digital stimuli help students overcome the feelings of frustration that may afflict them when facing difficulties during the educational process.	3.72	.875	High
7	15	Digital stimuli enhance students' educational practices by providing rewards.	3.59	.807	Mean
Mechanics			3.76	.700	High

Table 4 shows that the means for the role of educational digital stimuli in achieving academic passion from the point of view of vocational education students in the domain of mechanics which ranged between 3.59–3.89. Item 17 which states, “Digital stimuli constitute a winning strategy that achieves (fun and joy) for students” came in the first place, with a mean of 3.89. While item 15 which states, “Digital stimuli enhance students’ educational practices by providing rewards” came at the tail of the rank, with a mean of 3.59. The mean for the domain of mechanics as a whole was 3.76.

The components

The means and standard deviations of the role of educational digital stimuli in achieving academic passion from the point of view of vocational education students in the domain of “components”, for each item of the domain are presented in Table 5.

Table 5

Means and standard deviations related to the components

Rank	NO	Items	Means	SD	Level
1	19	Digital stimuli attract students' attention, by presenting educational content fragmented in the form of levels and challenges.	3.95	.696	High
2	29	Digital stimuli provide learning metrics that heighten their passion for learning through tools, such as time to learn, badges, and levels.	3.90	.775	High
3	23	Digital stimuli integrate students' knowledge in innovative new ways.	3.88	.858	High
4	24	Digital stimuli are designed according to the students' needs and desires.	3.83	.802	High
5	22	Digital stimuli help students master the content before performing the activities by presenting it in the form of short clips to learn knowledge of the skills.	3.82	.861	High
6	21	Digital stimuli provides students with digital stimuli (instructions, rules) needed for learning and exploration.	3.81	.741	High
7	27	Digital stimuli put students in situations that make them think to build their information and skills gradually.	3.79	.860	High
8	25	Digital stimuli encourage students to collect more points at the end of each lecture in order to raise the level of knowledge towards difficulty.	3.78	.847	High
9	20	Digital stimuli raise the level of students' motivation through moral rewards, represented by points, badges, and leaderboards, as they provide a visual presentation of students' progress and achievements.	3.76	.850	High
9	28	Digital stimuli expose students to more difficult challenges that increase as their skills increase to bring them to the peak level of the challenge.	3.76	.808	High
11	26	Digital stimuli employ two elements (speed and efficiency) at each level, to drive students towards achievement and earn badges.	3.65	.836	Average
Components			3.81	.619	High

Table 5 reveals that the means of the role of educational digital stimuli in achieving the academic passion of vocational education students in the domain of components ranged between 3.65–3.95. Item 19, which states, “Digital stimuli attract students’ attention, by presenting educational content fragmented in the form of levels and challenges”, came in the first place, with a mean of 3.95. Whereas item 26, which states, “Digital stimuli employ two elements (speed and efficiency) at each level to push students towards achievement and obtain badges” came in the last rank, with a mean of 3.65. The mean for assessing the learning of the students as a whole was 3.81.

RQ2. Are there statistically significant differences ($\alpha = 0.05$) in the role of educational digital stimuli in achieving academic passion among students of vocational education in the Jordanian universities in light of COVID-19 due to the variables (gender, school year, and type of university)?

In order to answer this question, the means and standard deviations of the role of educational digital stimuli in achieving the academic passion of vocational education students were extracted according to the variables of gender, academic year, and university type, at the level of the study tool domains as illustrated in Table 6.

Table 6

Means and standard deviations of the role of educational digital stimuli in achieving academic passion due to gender, academic year, and type of university

		Mean	SD	No
Gender	Male	3.72	.643	65
	Feminine	3.82	.609	195
Academic year	First	3.59	.424	52
	Second	3.72	.663	108
	Third	4.15	.747	43
	Fourth	3.85	.443	57
University type	Government	3.85	.611	185
	Private	3.65	.613	75

Table 6 displays the students' different categories of the study variables of gender, academic year, and type of university.

It is evident from Table 7 that there are no statistically significant differences ($\alpha = 0.05$) due to the effect of gender, where the p-value is 2.242, with a statistical significance of 0.136. Aso, there are statistically significant differences ($\alpha = 0.05$) due to the effect of the school year, where the p-value of is 8.253, with a statistical significance of 0.000. While there are statistically significant differences ($\alpha = 0.05$) due to the effect of the type of university, where the p-value of is 6.158, with a statistical significance of 0.014, and the differences are in favour of private universities.

Table 7

Triple variance analysis of the impact of gender, academic year, and university type on the role of educational digital stimuli in achieving academic passion

Contrast source	Sum of squares	Degrees of freedom	Mean of squares	p-value	Sig.
Sex	.773	1	.773	2.242	.136
Academic year	8.540	3	2.847	8.253	.000
University type	2.124	1	2.124	6.158	.014
The error	87.609	254	.345		
Total	98.741	259			

Table 8 shows that there are statistically significant differences at ($\alpha = 0.05$) the third-year students, on the one hand, and both first-year and second-year students, on the other hand, and the differences are in favour of the third year.

Table 8

Scheffe dimensional comparisons of the impact of the school year on the role of educational digital stimuli in achieving academic passion among students

		Mean	First	Second	Third	Fourth
Year of study	First	3.59				
	Second	3.72	-.13			
	Third	4.15	-.55*	-.43*		
	Fourth	3.85	-.25	-.13	.30	

* Function at the significance level ($\alpha = 0.05$).

Discussion

The results are discussed according to the research questions as follows:

The results of the first question revealed that the role of digital stimuli in achieving academic passion was at the required level, as it enjoyed great degrees of excellence in performance, as all responses of the study sample members of vocational education students were distributed within a “high” degree at the level of all domains, with a mean of 3.79. This confirms that these stimuli can bring about effective learning for students. Therefore, these results can be attributed to the fact that digital stimuli are compatible with the abilities and tendencies of students, as they provide fun and an element of suspense. Besides, they can also be attributed to the ability of digital stimuli to motivate students for continuous learning through learning by trial and error, and their suitability to the nature and methods of learning used in the twenty-first century. This result is in agreement with the study by Alhalafawy W. S. & Zaki M. Z. [24], who showed that digital content applications for mobile devices have an effective role in developing psychological happiness among students of the control group. As for the domains, all came within a high degree, and these domains can be discussed as follows:

The components

The results demonstrated that the answers of the study sample members to the components came with a high rating. This result can be attributed to the use of the leaderboards as a goal-oriented mechanism to be able to find satisfaction and self-efficacy and thus to achieve the academic passion of students. Also, what the feedback provides may act as a catalyst and inspire progress towards obtaining badges, and the appearance of students’ names in the leaderboards may achieve their academic passion. This depends on building knowledge of students in a constructive manner as a basis for students’ knowledge. This result is consistent with what was indicated by A. S. Zohny’s finding [32], which showed the effectiveness of digital stimuli in developing the motivation for academic achievement and the need for knowledge compared to non-motivational platforms, as well as compared to the usual methods. Item 19 that states, “Digital stimuli attract the attention of students, by presenting educational content fragmented in the form of levels and challenges” came in the first place, with a mean of 3.95, at a high evaluation level. This result may be attributed to the fact that linking educational goals at simple challenges increase as we provide educational content, and set rewards that are directly proportional to the students reaching the peak of the challenge.

Item 26 which states, “Employing digital stimuli elements (speed and efficiency) at each level, to push students towards achievement and obtaining badges,” came in the last place with a mean of 3.65 and at a medium assessment level. This result may be attributed to the fact that students have moderate skills to interact with digital stimuli, and the existence of an atmosphere of collective competition among students pushes them towards achievement and obtaining badges. This re-

sult is consistent with the findings of previous studies by Ryan R. M. et al. [4] and Al-Momani M. O. et al. [5], which showed that the employment of constructivist learning practices requires intensive training.

The results of the second question of the role of digital stimuli in achieving academic passion showed that there were no statistically significant differences at the level of statistical significance ($\alpha = 0.05$) in the responses of the study sample members according to the gender variable. This might be attributed to the fact that digital stimuli in the educational environment are designed for both sexes, and thus expose them to the same dynamics, mechanics and components, and they have the ease of assimilation for both. The results also showed that there were statistically significant differences at ($\alpha = 0.05$) in the responses of the study sample members according to the university type variable that was in favour of private universities, and on all domains of the scale (dynamics, mechanics, components). This might be attributed to the fact that private universities set a strategic vision through which they seek to reach advanced ranks in local, Arab and international classifications, by paying attention to the quality of teaching through the development of teaching methods and strategies and digital-based educational environments that are compatible with crises, and seeking to attract students to complete their studies through thier academic reputation.

Furthermore, the results showed that there were statistically significant differences at the level of statistical significance ($\alpha = 0.05$) in the responses of the study sample members according to the variable of the school year and in favour of the third year students, and on all domains of the scale (dynamics, mechanics, components). This might be attributed to the fact that the third year students have more knowledge and skills than the first and second year students, while the fourth year students are preoccupied with graduation projects and field training. Creating an educational environment based on digital stimuli for third year students will make a quantum leap in the students' psyche due to their reliance on traditional methods of learning. This is in agreement with the results of the study by Ali A., Aldardiri I. [28], who indicated the effect of digital stimuli in developing the skills of producing electronic educational games, and engaging in learning among students.

Conclusions and Recommendations

The results of the study revealed that educational digital stimuli play a major role in achieving the academic passion of vocational education students with a bachelor's degree. Therefore, we suggest activating digital stimuli as an educational strategy that would help faculty members achieve academic passion for students instead of providing information through traditional indoctrination methods, which impose an atmosphere of boredom, routine and stereotypes on students and limit their creativity. Specifically, the context of distance education requires the revitalisation of educational systems, by directing educational goals through the components of digital stimuli to adapt to a previously unmet situation on education

systems. This is to move students from feeling anxious to making their lives more prosperous with positive meanings that deserve perseverance in order to achieve them, and live for them. This is achieved by satisfying the basic psychological needs, such as creativity, challenge, curiosity, self-satisfaction, and psychological happiness, as a result of the feeling of appreciation and self-confidence that students feel due to obtaining rewards, and the appearance of their names in the leaderboards as a reinforcement for them on each goal they achieve. This leads to increased participation in unusually challenging activities and tasks, engaging in learning with a high motivation to achieve, and an aspiration to achieve more with a great challenge. Digital stimuli create an element of suspense and excitement by presenting educational content fragmented in the form of levels and challenges at a time concerned with great difficulties and challenges during the period of distance education experience throughout COVID-19 outbreak.

In the light of the findings, the study recommends:

1. To train teachers and faculty members on the use of digital stimuli and employing them in different educational situations because they make the learners feel that studying is not as difficult as it stimulates their eagerness to learn and satiates their curiosity;

2. To take into account the individual differences between learners and the difference in their academic characteristics such as information processing and self-efficacy, and to train teachers and faculty members following up on student learning in the light of these differences and working to increase them among learners through activities and practices, which reflect positively on their learning process.

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