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Survey of Students' Satisfaction with New Technologies and Online Education During the Covid-19 Epidemic

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ABSTRACT

Purpose: The purpose of this study was to investigate students' satisfaction with new technologies and online education during the Covid-19 epidemic.

Method: The research method was descriptive-survey. A researcher-made questionnaire was used. In this case the researcher developed new variables that were associated with student satisfaction in online learning, such as student commitment, student independence, parent supports, main source of supports of online learning, student readiness, creative and innovative teaching, effectiveness and behavior intention. The face and content validity of the questionnaire was confirmed by the professors. In order to meet the reliability and validity of the data, indicators that had a factor load ≤ 0.7 were removed from the model. The target population of this research was master's degree students in physical education of 10 universities in the country, and 412 people were selected as a sample using random sampling method.

Finding: Finally, the results showed that first, effectiveness has a significant impact on student satisfaction in online learning, second, student commitment has a significant impact on student satisfaction in online learning, third, student satisfaction has a significant impact on behavior intention students in online learning.

Conclusion: It is strongly recommended that in addition to the education of students, special attention should be paid to the quality of these educations. The evaluation of students' opinions about the quality of teaching is not only a measure to check the quality of teaching; Rather, it also focuses on the possibilities and necessities of educational correction and verification by revealing educational weaknesses. **©authors**

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Introduction

The year 2020-2021 is a scary year for the world's health. However, the impact does not just stop there, but the economic and education sectors also have an equally serious impact. The COVID-19 Pandemic has significantly impacted higher education systems worldwide (Crawford et al., 2020). Higher education institutes have abruptly and nearly permanently closed their campuses and decided to establish online learning. They have also repatriated the students identified as high-risk cases to contract the COVID-19.

In early 2020 until now, almost the whole world has implemented distance learning or online learning. This is very clear to avoid the impact of Covid-19 transmission. Unpreparedness in the early days of the pandemic for online learning must be faced in almost all countries. A study found that higher education in Romania is particularly unprepared for online learning and that technical problems are the most important, followed by the lack of technical skills of teachers and their teaching styles which are not well adapted to the online environment (Coman et al., 2020). Another study revealed that facility readiness has a significant effect on student satisfaction (Kumar, 2021). In addition, other countries have shown increased stress and anxiety due to the Covid-19 outbreak. Several stressors were identified that contribute to the increased levels of stress, anxiety, depressive thoughts, and difficulty concentrating among students (Son et al., 2020).

Research results in developed countries such as France and South Korea stated that the majority of French students expressed a preference for classroom teaching compared to online teaching, while Korean students' preferences were more balanced. On average, Korean students expressed higher satisfaction with online teaching compared to French students (Jung & Vranceanu, 2020).

In the past, online learning was only used for coursework, meaning that it was not fully carried out on a regular basis. In this case we can mention like Alison, Canvas Network, Coursera, iCourse, EdX, etc (UNESCO, 2020), where they all provide online courses with very interesting programs. The duration of time and continuity of learning are the impacts that differentiate between ongoing online learning and courses. It is undeniable that the research results show that online learning in these courses has a very significant impact.

Covid-19 has been going on for more than a year. The unavoidable impact is distance learning/online learning. Distance learning also provides opportunities to experiment with alternative teaching methods, tools and assessments (Alolaywi, 2021). Even more interesting, it was found that the WhatsApp Group platform became the most effective learning medium at the beginning of the pandemic Covid-19 (Wargadinata et al., 2020). In order to follow up online learning, practitioners in the field of education do not stop to be creative and innovate so that the learning created can make students understand and be satisfied with the learning held. One of the learning objectives is to make students satisfied with the learning process. There are quite a number of studies that reveal the relationship of student satisfaction with various other factors. In general, student satisfaction is influenced by perceived benefits, perceived pleasure, and effectiveness of multimedia content (Levent et al., 2013).

Information quality and self-efficacy have a significant influence on student satisfaction in online learning (Machado-Da-Silva et al., 2014) including self-efficacy (Alzahrani & Seth, 2021).In addition, providing motivation in online learning is the most important dimension as well as having a significant impact on student satisfaction (Kırmızı, 2015; Hermida, 2020; Hariyati et al., 2021) at the undergraduate level and postgraduate studies in Bangladesh (Rahman et al., 2021).

Communication and flexibility are also a very decisive part of student satisfaction in the online learning (Elshami et al., 2021). The level of effort made by the instructor, agreement on the appropriateness of the customized assessment method, and the perception of well-delivered online learning proved to be very important in determining satisfaction scores (Ho et al., 2021). The results showed that the important factors in ensuring online learning satisfaction were the

role of the instructor in providing online media training and the strength of peer interaction (Thach et al., 2021; Ngo et al., 2021; Nambiar, 2020; Nasir, 2020). This further confirms that technical readiness and interaction in online learning really determines the level of student satisfaction. The higher the level of satisfaction felt by students, the positive impact on student performance (Gopal et al., 2021) and further student achievement will increase (Basith et al., 2020). This becomes a very important foundation where student satisfaction leads to good and maximum academic results.

Regarding satisfaction and online learning, basically a lot of research has been done as described above, but in this case we / researchers try to develop other variables that are possible from various discussions in Iran that have an impact on online learning (Rohmah, 2020). The rest of the new variables that the researcher presents with the reason that these variables have never been associated with satisfaction and they are basically within students and very close to their scope, such as student commitment to learning, independence, parental support, the main source of support for online learning, student readiness, creative-innovative teaching, effectiveness and intensity of behavior.

Some of these things are very important to be investigated further with the aim of revealing the closest variables so that future learning can be managed properly. The various studies above are also mostly carried out in the early 2020-2021 so they are still included in the category at the beginning of an online learning experiment, while this research is in the mid-2021 quarter where online learning has become a new habit in educational institutions. Satisfaction is also a very important part where the measurement is based on students who in this case are the main actors who receive treatment from the online learning organization. With this research, the evaluation of online learning in an educational institution can be improved maximally.

Literature Review

The COVID-19 refers to the coronavirus disease 2019 caused by the novel coronavirus 2019 or “2019-nCoV” (Hermida, 2020). The COVID-19 is associated with the severe acute respiratory syndrome coronavirus 2 (SARS-CoV) that can also be life-threatening (Meng, 2020). Based on an online report issued by the Department of Health, the COVID19 Pandemic has left a massive impact on educational institutes, most of which have postponed in-person classes. Since educational institutes are closed, many countries worldwide have focused on e-learning because it is an alternative to conventional learning. In fact, e-learning refers to the use of ICT in teaching and learning processes (Alqahtani & Rajkhan, 2020). According to the Organization for Economic Cooperation and Development (OECD), e-learning is defined as the use of ICT in various learning processes to enhance and support learning in higher education institutes as well as in-person classrooms by adopting conventional, complementary learning, online learning, or a combination both methods (Arkorful & Abaidoo, 2015). In this study, e-learning refers to a method students use the Internet to acquire knowledge, create personal emotions, develop learning experiences, and grasp learning materials and interact with content, educators, and other learners to gain support during the learning process. Therefore, the students trained in this method need diverse abilities and skills to succeed. Due to the current COVID-19 Pandemic and the transition from conventional learning to e-learning, and the use of e-learning as a completely student-centred approach, students need a wide range of competencies to succeed in digital environments. In other words, it is naturally essential to pay attention to learner needs and identify the necessary skills and abilities required in designing online learning methods. Practical experience has shown that assessing the requisite skills of learners has had a long history in higher education studies.

Narenji Thani et al. (2021) found in a study entitled " COVID-19 and e-Learning: The skills and abilities required for e-learners in higher education during the coronavirus era" that the most critical components from e-learners’ view which more critical in digital learning were effective communication, use of the computer, active learning, learning skills, resilience,

motivation toward e-learning, emotional intelligence, interaction with e-learning system, self-direct learning, time management, flexibility and adaptability, critical thinking, creativity, asking someone for help, leadership skills, stress management, self-organized, cognitive skills and self-assessment.

Yu and Jee (2021) conducted a study entitled Online Class Analysis in Physical Education during Covid 19 epidemic and reported that the use of team projects was not practical and that students simply submitted their assignments and had no interest in them. They concluded that in order to successfully implement practical online physical education classes, timely feedback must be used, technical errors must be reduced, and learners must be continuously motivated.

O'Brien et al. (2020) in a study entitled Implicit Concepts for Virtual Physical Education in the Quid 19 epidemic reported that to better learn students' physical education, they should produce teaching aids along with physical contact, feedback, and instruction from an instructor. Content should be used according to the facilities of universities and the use of new and attractive methods for students.

Goad and Jones (2017) reported in their research to improve the effectiveness of online education and learning in virtual physical education four factors, modeling educational methods, coach-student interactions, transfer of educational concepts and content production online and navigation of teaching aids It helps.

Stephanie (2020) found that students should have specific competencies such as leadership skills, flexibility and adaptability, critical thinking, technical knowledge, communication, emotional intelligence, creativity, and innovation. Nambiar (2020) indicated that students should have soft skills such as self-directed learning, negotiation skills, stress management, self-assessment, and resilience. He concluded that all countries should ensure that the outputs of their education systems would be the students who could be competent in school, social, and emotional terms. The competency-based program has promoted digital literacy, communication, collaboration, critical thinking and problem-solving, creativity and imagination, and social responsibility. Although there are no definite sets of soft skills that can help tackle the challenges in everyday life, people should be purposeful in acquiring diverse delicate abilities to put them to practice when they confront challenging conditions.

Gay (2020) stated that the competencies of students during the COVID-19 were technical readiness (which evaluates a student's possession of and access to technology such as devices with appropriate software, access to the Internet and stable network connectivity, and digital literacy skills), study habits (e.g., essay writing skills and ability to collaborate online, student interaction with the course content, savviness with online communication), and preference for online learning (e.g., self-directed learning and self-confident). These competencies help students do their best during this Pandemic.

Method

The present research is a descriptive-survey research and has been conducted in the field. Due to the lack of accurate and valid tools to measure the variables studied in the present study, a researcher-made questionnaire was used by studying the theoretical foundations of the research and also interviewing experts. The face and content validity of the questionnaire was confirmed by consulting professors related to the research topic. The face and content validity of the questionnaire was confirmed by consulting professors related to the research topic. In the data analysis process, to meet the reliability and validity of the data, indicators that have a factor loading ≤ 0.7 were removed from the model. The target population of this study were all postgraduate physical education students in several universities in the country (University of Tehran, Kharazmi University, University of Guilan, University of Isfahan, University of Tabriz, Urmia University, Shahid Chamran University, Ferdowsi University, Kurdistan University, Razi University). They studied in an online education environment, then 412 people were selected as a sample using random sampling method. Data were analyzed using smart-PLS software.

Standard PLS-SEM analyses provide information on the relative importance of constructs in explaining other constructs in the structural model. Information on the importance of constructs is relevant for drawing conclusions. The importance-performance map analysis (IPMA) extends the results of PLS-SEM by also taking the performance of each construct into account.

Standard PLS-SEM analyses provide information on the relative importance of constructs in explaining other constructs in the structural model. Information on the importance of constructs is relevant for drawing conclusions. The importance-performance map analysis (IPMA) extends the results of PLS-SEM by also taking the performance of each construct into account. As a result, conclusions can be drawn on two dimensions (i.e., both importance and performance), which is particularly important in order to prioritize managerial actions. Consequently, it is preferable to primarily focus on improving the performance of those constructs that exhibit a large importance regarding their explanation of a certain target construct but, at the same time, have a relatively low performance (Hair et al., 2017)

Partial least squares is a solution for testing hypotheses and is used when the sample size is limited or the data is not normal. Without assumptions such as distribution assumptions, or nominal, ordinal, and interval scales for variables, the work results can be used. Of course, it should be kept in mind that partial least squares, like all statistical techniques, requires certain assumptions. The most important hypothesis is the "predictive" diagnosis. This requirement states that the systematic part of the linear regression should be defined based on the situational expectations of the dependent variable so that conclusions can be drawn based on the regression. However, the problem of large-scale stability remains. Considering the consistency problem in large samples, one can doubt the appropriateness of partial least squares and ask why this technique cannot guarantee one of the key properties of a statistical model (stability of the estimator). The answer is that this approach enters different situations with its own principles (Habibi & Jalalnia, 2022).

The hypothesis in this research is as follows:

H1. Parent support of online learning at home significantly influences on students satisfaction.

H2. Effectiveness of online learning at home significantly influences on students satisfaction.

H3. Student independence of online learning at home significantly influences on students satisfaction.

H4. Student satisfaction significantly influences on students intention of online learning.

H5. Student learning readiness of online learning at home significantly influences on students satisfaction.

H6. Commitment of online learning at home significantly influences on students satisfaction.

H7. Innovative-Creative teaching of online learning at home significantly influences on students satisfaction.

H8. Main source of supports for online learning at home significantly influences on students satisfaction.

Findings

a. Measurement model evaluation

In the data analysis process, to meet the reliability and validity of the data, indicators that have a factor loading ≤ 0.7 must be eliminated from the model. Calculation and non-parametric testing with all indicators that have a factor loading ≥ 0.7. The analysis in Cronbach's α (≥ 0.7), Composite Reliability (≥ 0.7), AVE (≥ 0.5) for assess convergent validity (Hair et al., 2019). Collinearity testing was carried out by looking at the value of the variance inflation factor (VIF), Burns and Burns (2008) stated that there was collinearity if the VIF number 10.0, but recommends a maximum cut off value of 5.0. The results of the reliability, validity and collinearity tests are presented in the following table:

Table1: Measurement Model & VIF

Variables (code)	Indicator	Outer Loading	CA	CR	AVE	VIF
Commitment			0.815	0.877	0.642	
X2	Students maximize themselves taking online learning.	0.787				1.656
X3	Students read the material that has been given by the Lecturer.	0.839				1.905
X3	Students read, and re-understand the material that has been delivered.	0.840				1.838
X6	Students actively confirm that they are on a path that is truly seeking knowledge.	0.734				1.553
Independence			0.790	0.864	0.614	
X9	Students actively seek primary reading sources for ongoing courses without being asked.	0.814				1.867
X10	Students actively seek secondary/additional reading sources.	0.803				1.886
X11	Students actively re-understand the lecture material until they understand.	0.799				1.579
X12	Students try to activate the classroom atmosphere by asking and giving opinions.	0.713				1.306
Parent Support			0.807	0.865	0.563	
X13	Parents fully support their children's study schedule outside of online learning.	0.723				1.551
X14	Parents do not order / give work as long as their children are taking online learning.	0.705				1.492
X15	Parents actively remind their children to take online learning.	0.820				1.889
X17	Parents actively ask about all the needs of online learning, especially to support online learning.	0.759				1.732
X18	Parents never blame anything related to student online learning.	0.740				1.523
Main source of Support			0.758	0.892	0.805	
X23	Students actively visit campus online libraries, national libraries or other online libraries.	0.899				1.593
X24	Students exchange books/e-books/journals with other students.	0.895				1.593
Learning Readiness			0.801	0.870	0.627	
X25	Students prepare themselves before online learning begins.	0.768				1.547
X26	Students actively read the material before the lecture starts.	0.846				1.921
X27	Students actively seek and prepare references that have been suggested by the lecturer.	0.817				1.820
X29	Students actively discuss material with friends outside the class schedule.	0.731				1.421
Innovative and Creative Teaching			0.899	0.922	0.663	
X31	Lecturers (in general) determine online media (Telegram, Whatsapp group, etc.) by deliberation.	0.727				1.890
X32	Lecturers (in general) actively use various platforms for online learning media.	0.840				2.411
X33	Lecturers (in general) provide material in the form of Power-points/Material Modules/Blogs/Journals/E-books (minimum 4).	0.769				2.095
X34	Lecturers (in general) are active in providing contextual discourse of the material being taught.	0.859				2.800
X35	Lecturers (in general) not only deliver material but also sometimes give quizzes, or motivation to lighten up the class atmosphere.	0.851				2.517
X36	Lecturers (in general) actively give ice-breaking in various ways.	0.830				2.347
Effectiveness			0.875	0.909	0.667	

X37	Online learning teachs students to be more independent in managing time and studying.	0.769				1.814
X38	Online learning makes students more active in expressing their opinions.	0.858				2.858
X39	Online learning makes students learn not to be ashamed when they have an opinion.	0.848				2.719
X40	Online learning makes time to study science more unlimited.	0.824				2.214
X41	Online lectures make all college activities and home activities more organized and scheduled maximally.	0.780				1.851
Satisfaction			0.820	0.893	0.736	
Y1	Online learning makes students more qualified in terms of academics.	0.883				2.412
Y2	Online learning makes students more qualified from the professional side.	0.872				2.301
Y8	I would recommend to anyone how good the quality of online learning is.	0.817				1.494
Behavioral Intentions			0.929	0.943	0.701	
Y9	Online learning is the right answer for a better education now and in the future for me.	0.788				2.374
Y11	I tell other people/society that I get a lot of knowledge development from online learning.	0.823				2.394
Y12	I tell other people/society that I enjoy online learning.	0.853				2.914
Y13	I tell other people/society that online learning makes me more independent.	0.811				2.576
Y14	I will recommend to the public that online learning is good and fun to learn.	0.870				3.392
Y15	I will recommend to the public that online learning makes them creative in learning.	0.863				3.366
Y16	I will recommend to the public that online learning improves and broaden the horizons of thinking.	0.848				3.031

Note: Unqualified variables have been excluded from model CR & Cronbach $\alpha \leq 0.7$, AVE ≤ 0.5,and VIF $\geq$ 5.0

b. Structural model evaluation

Once the convergent validity assessed, the discriminant validity has to assess for the confirmation that the all the constructs of model has different concept. Instead of suggested technique of Fornell and Larcker (1981) the research used the heterotrait-monotrait ratio of correlations (HTMT) as suggested by the researchers (Hair et al., 2017; Henseler et al., 2015).

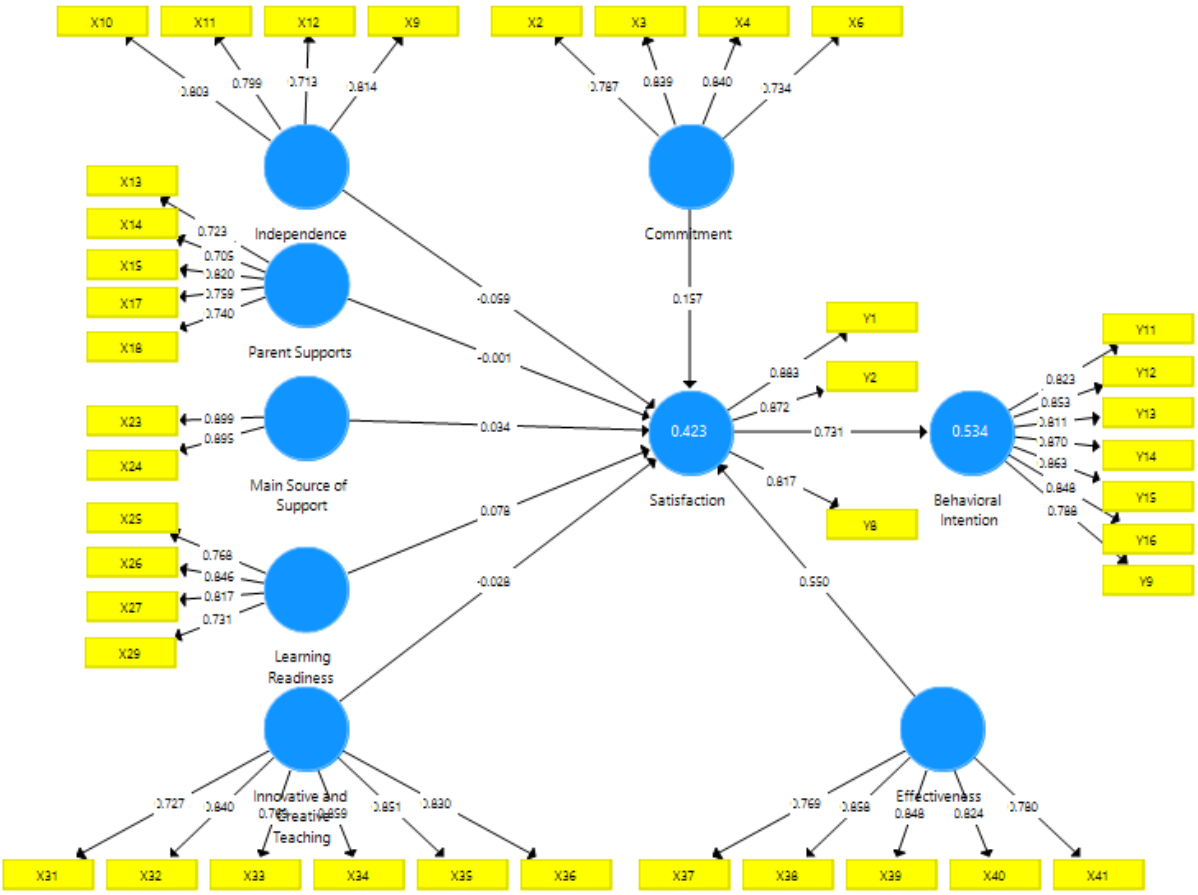
Table 2: Discriminant validity

	PS	**BI**	**Eff**	**Ind**	**Sat**	**LLR**	**Com**	**ICT**	**MSS**
PS	**0.751**								
BI	0.313	**0.837**							
Eff	0.438	0.613	**0.817**						
Ind	0.346	0.352	0.463	**0.784**					
Sat	0.316	0.731	0.639	0.367	**0.858**				
LR	0.418	0.444	0.548	0.701	0.440	**0.792**			
Com	0.390	0.349	0.483	0.730	0.432	0.640	**0.801**		
ICT	0.338	0.331	0.507	0.468	0.352	0.590	0.454	**0.814**	
MSS	0.367	0.322	0.362	0.452	0.312	0.548	0.466	0.356	**0.897**

c. Predictive Accuracy and Relevancy

We use predictive accuracy and relevancy, to see how independent variables influence its dependent variables. To determine the predicted level of the variable, the R2 and Q2 values

must be measured. In order to find the Q2 value on Smart PLS, it is necessary to take additional steps by using Blindfolding calculations (Q2 = 1-SSE / SSO). Variables that have R2 0.75, 0.50 and 0.25 have substantial (high), moderate, and weak degrees of analysis, while variables that have a Q2 value greater than 0, 0.25, and 0.50 depict small, medium and large (Hair et al., 2019).



Structural model with adjusted R^2 Values.**Figure 1**

Table 3. Predictive Accuracy and Relevancy

Variables (code)	R^2	R^2 *Adjusted*	Q^2	*Effect Size*	*Predictive Accuracy*
Satisfaction (Sat)	0.433	0.423	0.301	Weak	Medium
Behavioral Intention (BI)	0.535	0.534	0.369	Moderate	Medium

Table 4. Hypothesis Testing

Path	SD	T-Statistics	P-Values	Decision
Parent Supports-Satisfation	0.051	0.029	0.977	Rejected
Effectiveness – Satisfaction	0.056	9.828	0.000**	Accepted
Independence – Satisfaction	0.068	0.875	0.382	Rejected
Satisfaction – Behavioral Intention	0.031	23.797	0.000**	Accepted
Learning Readiness – Satisfaction	0.074	1.050	0.294	Rejected
Commitment – Satisfaction	0.065	2.414	0.016**	Accepted
Innovative and Creative Teaching-Satisfaction	0.057	0.491	0.623	Rejected
Main Source of Support- Satisfaction	0.053	0.642	0.521	Rejected

Note(s): **p<0.05;**p<0.01*

d. Importance-Performance Matrix Analysis (IPMA)

IPMA is to identify the factor that has significant importance for the particular target construct development, with the comparison of low performance (Martilla & James, 1977). We feel it is

necessary to present the most influential factors, considering that this research was conducted during the Covid-19 pandemic. Effectiveness (EFF) is the variable that has the most influence on Satisfaction (Sat) compared to other variables (Commitment, Independence, Innovative and Creative Teaching, Learning Readiness, Main Source of Supports, & Parent Supports). Furthermore, Satisfaction is the most influential variable on Behavioral Intention (BI), compared to other variables in the Table 4 & 5 model, showing the results of IPMA testing on Satisfaction (Sat) and Behavioral Intention (BI).

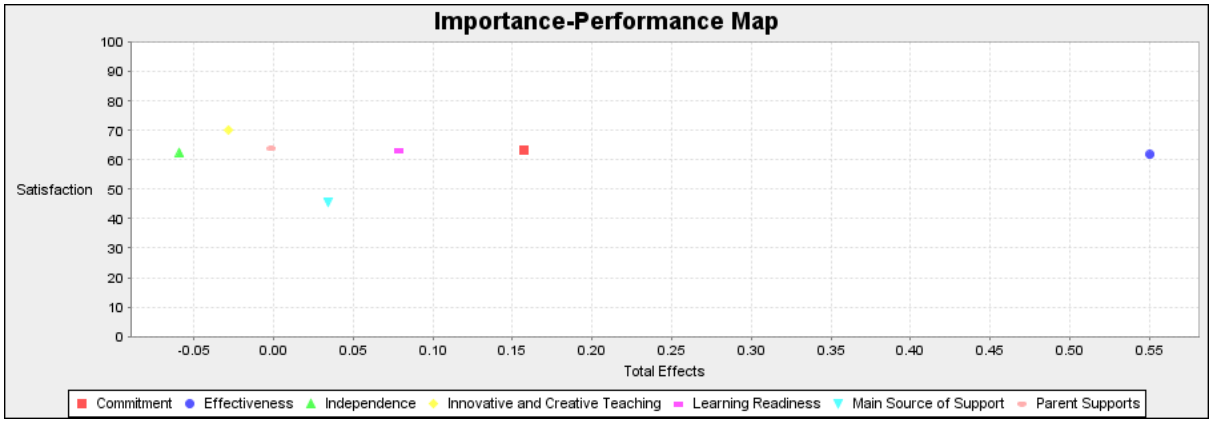


Figure 2. *IPMA Satisfaction (Standardized Effect)*

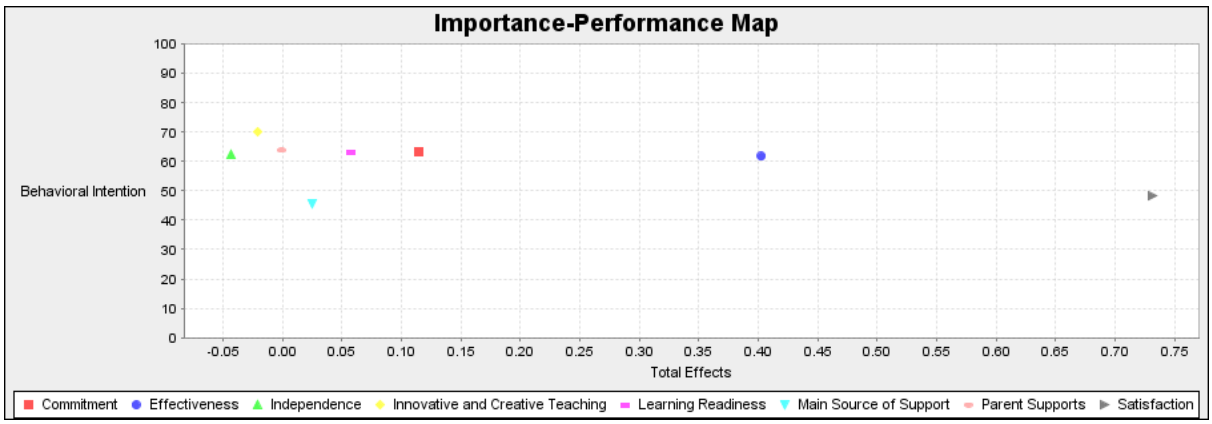


Figure 3. *IPMA Behavioral Intention (Standardized Effect)*

IPMA is to identify the factor that has significant importance for the particular target construct development, with the comparison of low performance (Martilla & James, 1977). We feel it is necessary to present the most influential factors, considering that this research was conducted during the Covid-19 pandemic. Figures 2 and 3 respectively show IPMA for Satisfaction and Behavior Intention.

Discussion

After the emergence of coronary heart disease, many educational equations in the educational system in the world and even in Iran underwent changes. At first, this situation unexpectedly surprised the entire educational system of the country and caused a great shock in all educational systems. These changes were to create a new curriculum based on social distance and virtual and online education. However, due to the novelty of this educational method, its effectiveness is questionable. The aim of this study was to investigate students' satisfaction with new technologies and online education during the Covid-19 epidemic. The results of this study stated that there were 412 respondents who had filled out the questionnaire. From these results, it is known that there are three variables that have a significant impact, namely student

commitment, learning effectiveness, and the relationship between satisfaction and the intensity of student behavior that takes place in the online learning.

When examined one by one and in more depth, commitment is one of the internal variables that exist in each student which, when associated with online learning, refers to the responsibility of students in taking the lectures. Several things that affect commitment are the level of self-awareness, student personality and student performance (Anghelache, 2013). There are three levels of commitment, namely low, moderate and high (Glickman, 2002). From the results above, it appears that the various challenges that exist in online learning they face ready and with maximum responsibility so that they feel satisfied with online learning which is taking place for two year. The results of this study differ from the framework which states that satisfaction has an impact on commitment (Ranadewa et al., 2021), where commitment should be a variable that has an impact on satisfaction. As the research results reveal that the commitment of lecturers in teaching has a significant impact on student satisfaction (Sopiah & Etta, 2019).

In addition, the effectiveness factor itself is a factor that is on the external side but once it becomes the closest part to the impact that students receive when using online learning effectively and efficiently. In terms of time management, regularity, leeway in time so that they are more able to develop other more useful potentials such as increasing portions for reading books, doing assignments on time, and making online learning a place to train and improve mentally during discussions. that is by forcing yourself to always ask and have an opinion. In the pre-covid-19 period, a study released that the effectiveness of online learning basically had the same impact as traditional learning or classroom learning as in general (Nguyen, 2015). Even though the results are the same, online learning cannot completely replace traditional learning (Hussain et al., 2020).

Meanwhile, A research result found that there was a positive impact of effective teaching strategies on producing good and fast learning outcomes (Raba, 2017). Furthermore, effectiveness here basically emphasizes online learning as a whole with everything that is received and done when students use online learning. As research results in high schools in Romania confirm that students react differently to online education, and their reactions are based on their proficiency in using online tools, their ability to technically access online courses, and the way instructors conduct learning activities (Butnaru et al., 2021).

While the last factor is student satisfaction where this leads to the intensity of student behavior in using online learning both now and in the future. Satisfaction that leads to this intensity also refers to learning outcomes that make them more qualified academically and professionally. Thus, it is undeniable that in particular, respondents or students expressed satisfaction when it was associated with the use of online learning in the present and in the future.

As for other variables which were rejected in this study, this indicates that the online learning journey provides different dynamics. However, this research has provided a maximum and comprehensive picture after educational institutions hold online learning on an ongoing basis and students have been able to feel the various challenges that exist in taking online learning.

The results of this study indicate that, first, parent supports does not significantly impact on student satisfaction in online learning, second, effectiveness has a significant impact on student satisfaction in online learning, third, independence does not significantly impact on student satisfaction in online learning, fourth, student learning readiness does not significantly impact on student satisfaction in online learning, fifth, student commitment has a significant impact on student satisfaction in online learning, sixth, creative and innovative teaching does not significantly impact student satisfaction in online learning, seventh, main source of supports learning does not significantly impact on student satisfaction in online learning, eighth, student satisfaction has an impact on the intensity of student behavior in online learning.

This research provides a complete picture where the online learning process has been carried out continuously and optimally. In addition, it also reveals new variables that have been proposed in this study. The shortcoming in this research is that it does not directly link the

Covid-19 pandemic conditions that take place in research settings which are likely to have different impacts. The next research recommendation should focus more on exploring and elaborating various factors that have a significant impact. This will reveal a mediator that functions to strengthen the variables of commitment, effectiveness and satisfaction itself.

Among the limitations of this research, the following can be mentioned:
- In the present study, only questionnaires were used to collect information.
- Regarding the topic of this research, there were no exactly similar sources.
- This research was conducted on a limited statistical population in half of the country's provinces.
- Students are not optimistic about researchers' research due to not using its results to solve existing problems in the organization in question
- The state of mind of students when filling out questionnaires and giving time to collaborate with researchers

Suggestions and strategies:

- ✓ Reducing the price of internet packages or making the internet free of software for virtual education.
- ✓ Evaluation of students based on a combination of practical processes, classroom activities, etc. in addition to the exam: Due to the technical problems that exist in the field of virtual education and students may have problems during the end-of-semester exam, it is suggested that professors determine a combination of activities for valuing and grading.
- ✓ Attendance of more important lessons and virtualization of less important lessons: If we want to look at virtual education as a method of teaching in post-Corona, it is suggested that practical and specialized lessons be taught face-to-face and theoretical and general lessons be taught virtually.
- ✓ Providing a database or virtual library: Considering the unavailability or difficult access to libraries, it is suggested to set up a virtual library.
- ✓ Providing the possibility of posting books from the library: it is possible to post books for students who do not have access to the library.
- ✓ Giving a specific resource to students by the professor.
- ✓ Organizing a joint meeting between professors and students to propose student demands: Because there is no direct communication between professors and students in virtual education, it is suggested to organize a meeting between professors and students of each course before the start of the semester to present their demands. And don't get into trouble during the virtual semester.
- ✓ Changing the teaching methods of professors according to the conditions of virtual education: It is suggested that professors change their teaching methods according to the conditions of virtual education so that students are encouraged to attend the virtual class full time.
- ✓ Requirement that webcams be turned on during the exam to prevent cheating: To prevent cheating in exams, it is recommended that the webcams be turned on.
- ✓ Presenting a summary of the class to the professor to increase students' understanding and attention: In order to increase student participation and make the class not one-sided, it is suggested that the professors receive a summary of the students' point of view for each session and lesson.
- ✓ Providing conditions for students to interact with professors and other students.

Conclusion

It is strongly recommended that in addition to the education of students, special attention should be paid to the quality of these educations. The evaluation of students' opinions about the quality of teaching is not only a measure to check the quality of teaching; Rather, it also focuses on the possibilities and necessities of educational correction and verification by revealing educational weaknesses. By using this approach, the experience of successful teaching-learning styles can be introduced, specified and evaluated, and it can initiate the cycle of reforming and improving the education process even in critical conditions such as the Covid-19 pandemic.

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