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ICT4EDU:
Enhancing ICT Competencies of Early Childhood Educators at HEIs in MENA Countries

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Executive Summary

In order to investigate the need in partner countries HEIs for newly graduated student to be able to teach using ICT and for improving teachers and students' digital competencies especially when dealing with children with special educational needs or disabilities, surveys were prepared and maintained online for the investigation process.

This document is a fulfilment to WP 2.2: Report on teachers and students ICT competencies through a survey for exploring current university staff digital competencies and a survey for exploring current university students' digital competencies with focus on Early Childhood Education (ECE) programs and other relevant academic programs. The surveys were designed to target university staff members and students at different universities from Jordan, Egypt and Palestine.

The main purpose of this report is to investigate and summarize current ICT competencies and the needs to enhance the current ICT competences at university staff and students' level in partner countries. In addition, to define the current needs and establish clear road map to enhance and adopted ICT competencies among ECE educators and students at HEIs in partner countries.

The data were collected by circulating the surveys online to the university staff and students in Jordan, Egypt and Palestine. We have received 2121 responses for the survey that target university students, and 391 responses received from the survey that target university staff. The survey data indicate that in order to improve the quality of ICT competencies among early childhood educators and students in partner countries, it is essential to enhanced university staff and university students with relevant modern ICT competencies through capacity building, and using an ICT based curriculum for teaching and learning. This includes supporting educators and students with the advanced ICT tools, providing continuous training for staff and students, and providing appropriate infrastructure at ECE departments. The survey's findings shows that there is lack of specialized labs and ICT infrastructure to allow students work in groups and in teams, which deny educators to emphasize on creating digital contents and resources to meet my students' differences and learning styles.

Background and Objectives

Early Childhood Education (ECE) is considered an important base for life-long learning and whole person development and the most important and vital of all stages in the proper development of a child whether is in the emotional, behavioral or cognitive domain. Early years of child life are crucial as it is of the utmost importance in the child's physical, emotional and intellectual development.

In line with the current digital era, teachers are required to integrate ICT in their daily teaching and replace their traditional methods with modern tools and facilities. Carrying out this project is essential for undersetting practices, and impacting policies and curricula in school of educational sciences and for the integration of ICT teacher education to meet the requirements for digitally competent youth and children.

In this report, the surveys target university staff and students. The survey's findings will be implemented within the project framework (ICT4EDU) to enhance ICT skills of early childhood educators at HEIs in partner countries. The primary objective of the surveys is to enhance the quality of ICT competencies of early childhood teacher and educators in higher education institutions in Jordan, Palestine, and Egypt in line with advanced EU practices, thereby enhancing the quality of education in pre-schools and primary schools in Jordan, Palestine, and Egypt.

This work package aims at scoping the current situation of ICT utilization in ECE in the beneficiary partners institutions including the extent of how the digital resources is represented in the study programs, as well as identifying the real competences that have to be provided to teachers and students and to verify the facilities of partners to develop the existing resources.

Scope and Procedure

The major activity of Work Package 2 aims at scoping the current situation of ICT utilization in ECE in the beneficiary partners institutions including the extent of how the digital resources is represented in the study program. The project will commence in a scoping and needs analysis exercise to investigate the real competencies that have to be provided to teachers and students. In

addition, to investigate the facilities of partners institutions to develop the existing resources. The scope and procedure of the work package can be summarized as per the following points.

- A survey on current situation of the level of ICT integration in early childhood education teaching and learning materials was be conducted at each partner institution and at each department level.
- Identifying the weakness and strengthen the curricula, verifying the courses offered, what to update and what courses needed. Taking into account the courses proposed by each partner at the proposal preparation stage. This is to be carried out on regional level by all beneficiary partners.
- To examine the ICT usage habits and the self-assessed ICT competencies possessed by undergraduate students in EC teacher preparation programs as well as to investigate the level of competences and then needs of the teaching staff.
- Results in identifying the real ICT competencies that have to be provided to both target groups, and define the most competitive and high valued situation and trends in ICT as well as to figure out the new technologies and digital that should be integrated within the new curricula, this will assist in reviewing, modernizing and designing the new ICT-based teaching materials.
- Verifying partners facilities in order to build on existing resources available in partner universities, distribution of surveys with related parties inside each partners university and department level.
- Demonstrates the gap analysis, and the needs for capacity building, infrastructure, and human resources.

Organization of Work Package - 2

The Team of Palestine Technical University – Kadoorie (PTUK) was defined as leader for the work package 2. The co-lead universities are Irbid National University (INU), Mutah University Ltd (MU), and Suez Canal University (SCU). The following questionnaires prepared according to the project description, approved by all partners, and maintained by PTUK team online.

1. In-depth survey on State of the art of ICT in ECE (Curriculum Verification).

2. In-depth survey on Teachers and Students Digital Competences. This survey was divided into two different surveys for teachers and students.
3. In-depth survey on available facilities and resources at EC departments

Additionally

4. A complementary survey has been designed and distributed to targets school teachers and principals to investigate their needs in order to offer ICT skills and competences for university students and facility staff.
4. The surveys was developed and maintained online by PTUK team with the help and approval of the co-leaders and all partners. The distribution of the surveys was carried out by the help of all partner institutions.

Teams from INU, MU, and SCU has translated the surveys from English into Arabic and the surveys maintained online by PTUK team. The partner universities from Jordan, Egypt and Palestine collected responses and filled surveys online. The analysis and reporting of the results from all surveys was completed by PTUK team, reviewed and approved by the co-leaders and all partners.

Table 1 Responsibilities distributions among partners

#	Name	Country	Survey on teachers and students ICT competencies
1	University of Jordan (JU)	Jordan	Coordination, approval, and collect responses from Jordan
2	Irbid National University (INU)	Jordan	Co-lead, approve, and collect responses from Jordan
3	Mutah University LTD (MU)	Jordan	Co-lead, approve, and collect responses from Jordan
4	Al-Azhar University (AZHU)	Egypt	Approve and collect responses from Egypt
5	Suez Canal University (SCU)	Egypt	Co-lead, approve, and collect responses from Egypt
6	Heliopolis University Association (HUSD)	Egypt	Approve and collect responses from Egypt
7	Palestine Technical University Kadoorie (PTUK)	Palestine	Lead, approve, maintain surveys responses online, and collect responses from Palestine
8	Palestine Technical College – Dier Elbalah (PTC)	Palestine	Approve and collect responses from Palestine
9	Al-Istiqlal University (PASS)	Palestine	Approve, and collect responses from Palestine

Surveys Results

In this report, the results of the surveys are divided into two parts. The first part is targeting university staff digital competencies and the second part for university students' digital competencies. Each survey shall be discussed in detail as per the following sections.

University Staff Digital Competencies Survey Results

This survey is divided into three sections as follows.

Part A: Contact Information & University Profile.

Part B: ICT Literacy.

Part C: University staff proficiency in the use of ICT based tools in teaching and learning.

The following demonstrate the sample properties for Part A and Part B.

Table 2 University staff sample properties - Part I

Variable	Level	Frequencies	Percentage
Choose your university	University of Jordan (JU)	71	18.2 %
	Irbid National University (INU)	81	20.7 %
	Mutah University LTD (MU)	36	9.2 %
	Al-Azhar University (AZHU)	19	4.9 %
	Suez Canal University (SCU)	33	8.4 %
	Heliopolis University Association (HUSD)	22	5.6 %
	Palestine Technical University Kadoorie (PTUK)	39	10.0 %
	Palestine Technical College – Dier Elbalah (PTC)	40	10.2 %
	Al-Istiqlal University (PASS)	50	12.8 %
College/Faculty	Engineering	37	9.5 %
	Applied Sciences	7	1.8 %
	Business and Economics	41	10.5 %
	Agricultural Science and Technology	8	2.0 %
	Arts and Educational Sciences (Humanities)	141	36.1 %
	Information Technology	57	14.6 %
	Graduate Studies	7	1.8 %
	Physical Education and Sport Sciences	5	1.3 %
	Pharmacy	2	0.5 %
	Others	86	22.0 %
Gender	Male	232	59.3 %
	Female	159	40.7 %
	Prefer not to mention	0	0.0 %
Age	25 - Less than 30	63	16.1 %
	30 - Less than 40	84	21.5 %
	40 - Less than 50	128	32.7 %
	50 - Less than 60	77	19.7 %
	60 or above	28	7.2 %
	Prefer not to mention	11	2.8 %
Total		391	100 %

Table 2 University staff sample properties - Part II

Variable	Level	Frequencies	Percentage
Academic Level	Bachelor	61	15.6 %
	Master	58	14.8 %
	PhD	259	66.2 %
	Other	13	3.3 %
I am currently teaching in an ECE study programme	No	286	73.1 %
	Yes	105	26.9 %
Computer and ICT Literacy	Poor	8	2.0 %
	Basic	13	3.3 %
	Good	150	38.4 %
	Excellent	220	56.3 %
Computer Training	Non-formal (Self-Training)	228	58.3 %
	Formal (Professional Development)	129	33.0 %
	None	34	8.7 %
Years of Computer Use	Less than one year	8	2.0 %
	1 - Less than 2 years	18	4.6%
	2 - Less than 3 years	7	1.8
	3 - Less than 4 years	21	5.4
	4 years or above	337	86.2 %
Access to Internet	Faculty Library	18	4.6 %
	Faculty e-learning Centre	65	16.6 %
	Home	303	77.5 %
	Internet Café	5	1.3 %
Frequency of Internet Use	Never	3	0.8 %
	Once a week	13	3.3 %
	Several times a week	43	11.0 %
	Daily	332	84.9 %
Use of Email	Monthly	27	6.9 %
	Weekly	102	26.1 %
	Daily	262	67.0 %
Total		391	100 %

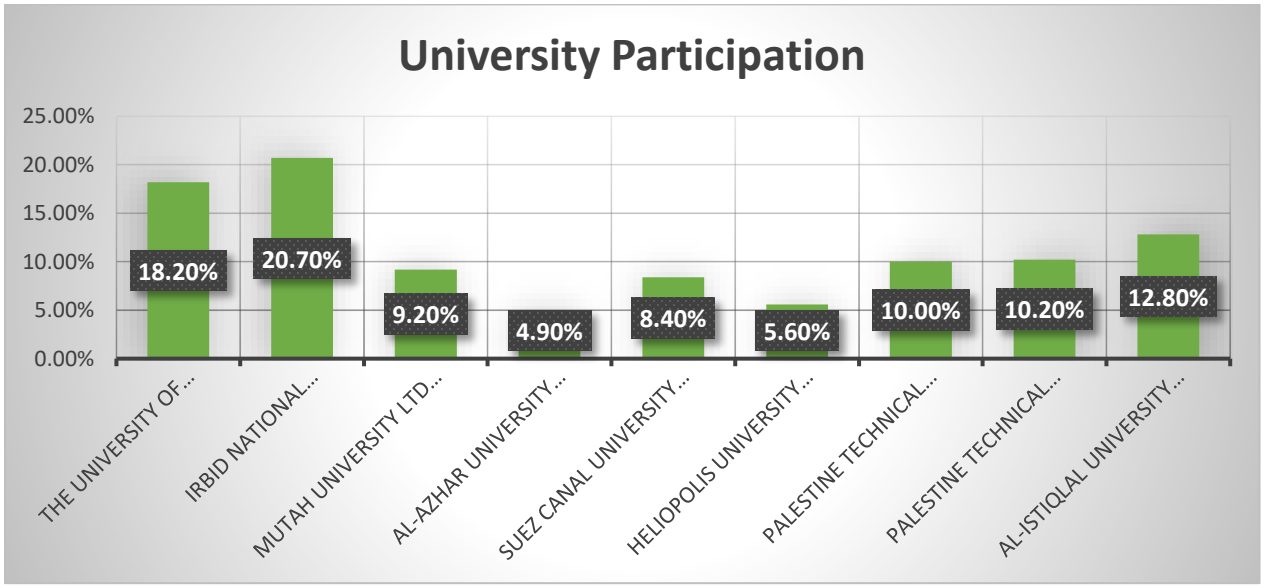

Figure 1. University participation

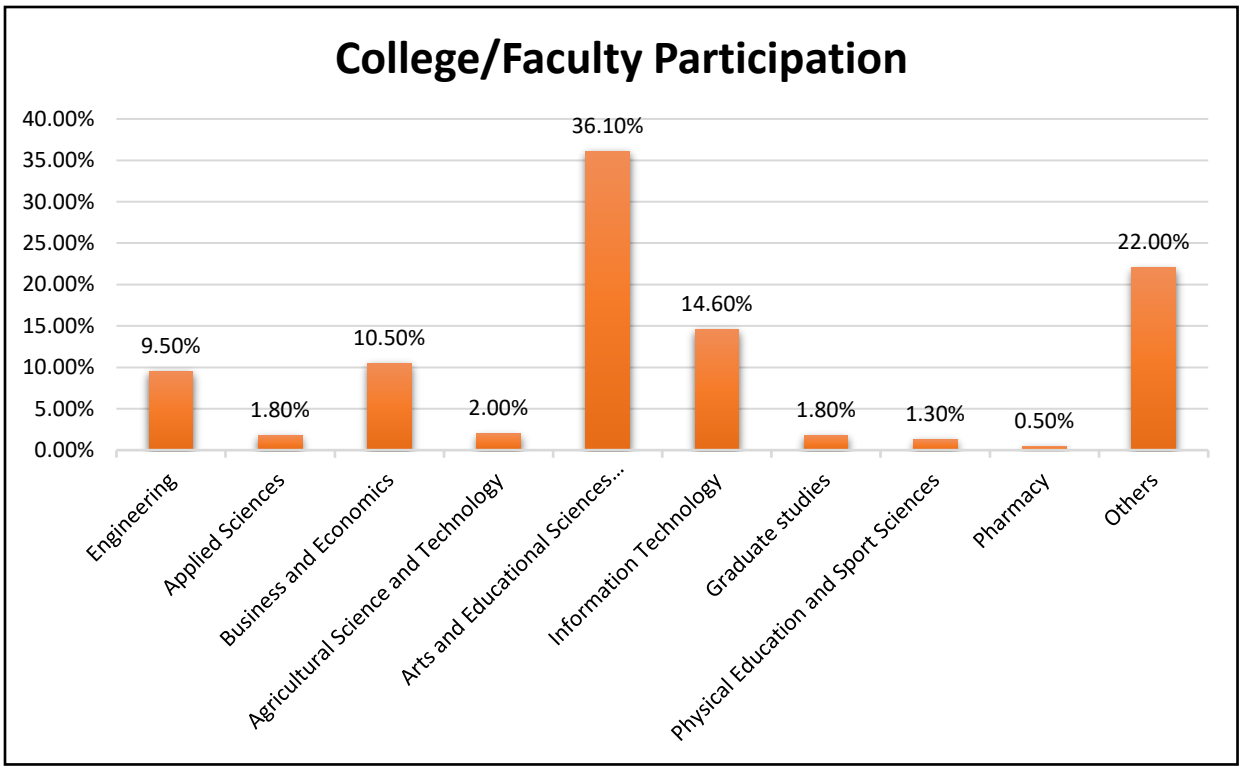

Figure 2. College/Faculty participation

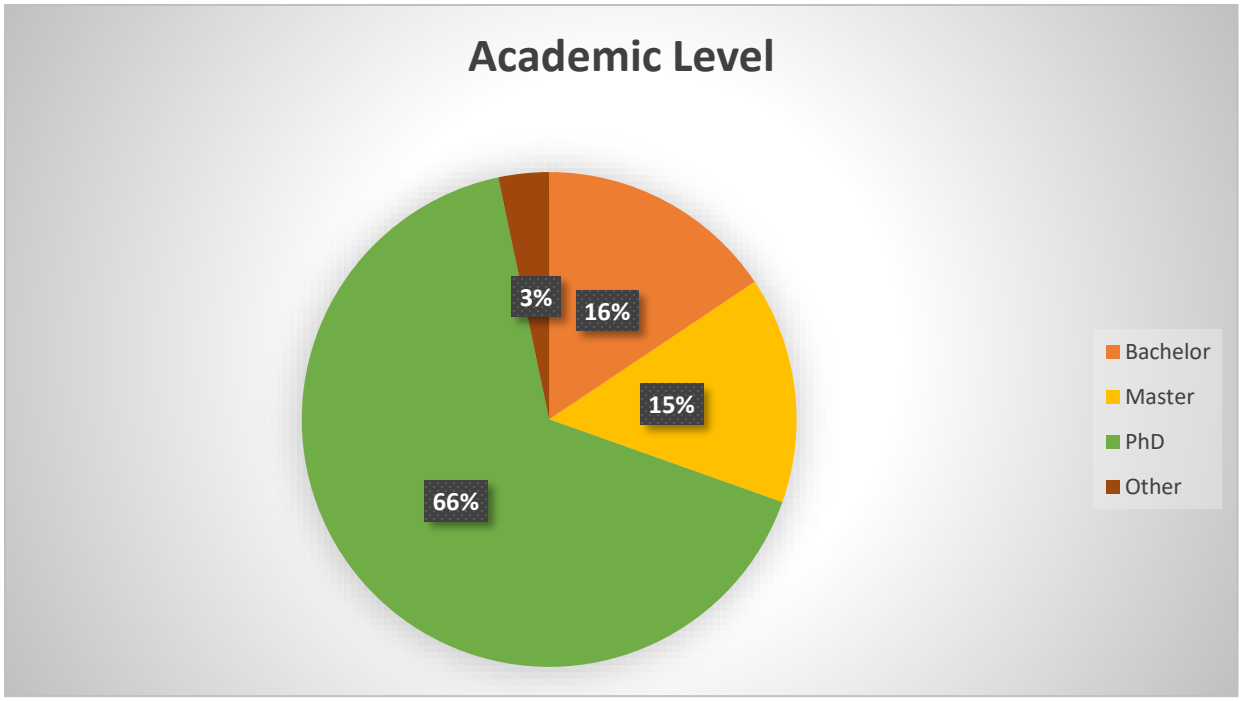

Figure 3. Academic level

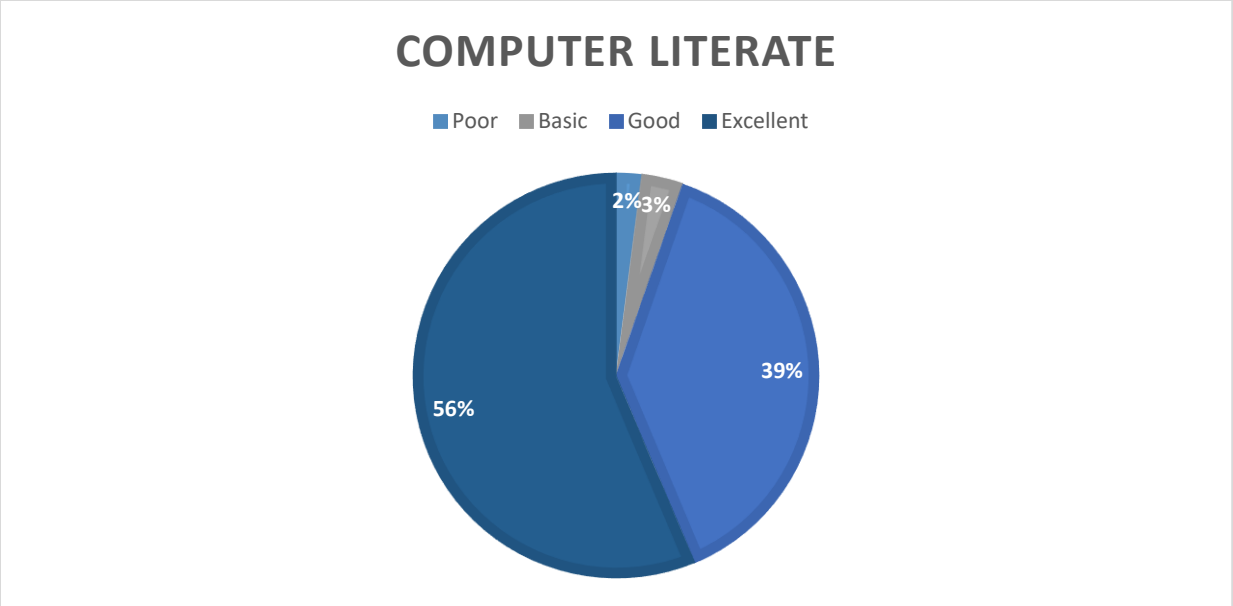

Figure 4. Computer literacy

Stability of the Staff Sample Study Tool

The stability was verified by calculating the stability Cronbach's Alpha equation. Cronbach's Alpha stability coefficient was calculated and this is evident as demonstrated in Table 3 below.

Table 3 Cronbach's Alpha stability values for the questionnaire items

Items	Number of Items	Cronbach's alpha values
Efficiency of teachers in the use of ICT-based tools in teaching and learning.	4	0.930
Professional involvement	4	0.942
Teaching and learning	7	0.968
Evaluation	3	0.944
Empowering learners	3	0.933
Facilitating digital competencies for learners	5	0.958
Over All	26	0.985

Table 4 Correction key to interpret the study paragraphs

Arithmetic Mean Period	Degree/Class
less than 1.8	Very low
1.8 - 2.59	Low
2.6 - 3.39	Medium
3.4 - 4.19	High
4.2 and above	Very High

The sample properties for Part C: University staff proficiency in the use of ICT based tools in teaching and learning are demonstrated as per the following.

Level One: Digital Resources

Arithmetic means, standard deviations and the degree for the first level are determined for the validation of teachers' competence in using ICT tools and digital resources.

Table 5 Digital Resources

Digital Resources Items	Arithmetic Mean	Standard Deviation	Degree
I use various internet sites and search strategies to find and select different ICT resources	3.60	1.386	High
I create my digital resources and modify existing ones to adapt them to meet my students' differences and learning styles	3.24	1.289	Medium
I effectively protect sensitive content; for example, exams, students' grades, and personal data	3.59	1.398	High
I assist students in using digital tools ethically and legally to protect ICT copywrite and licenses	3.35	1.291	Medium
Over All	3.44	1.220	High

Table 5 indicates that the answers of the study sample towards the efficiency of the teachers in the use of digital resources and tools based on information technology was high. The most approved paragraphs were (I use various internet sites and search strategies to find and select different ICT resources) with a high degree. The most unapproved paragraphs (I create my digital resources and modify existing ones to adapt them to meet my students' differences and learning styles) with moderate degree. The sample demonstrates the need to enhance digital resources creation by supporting the teachers by the required ICT resources and training.

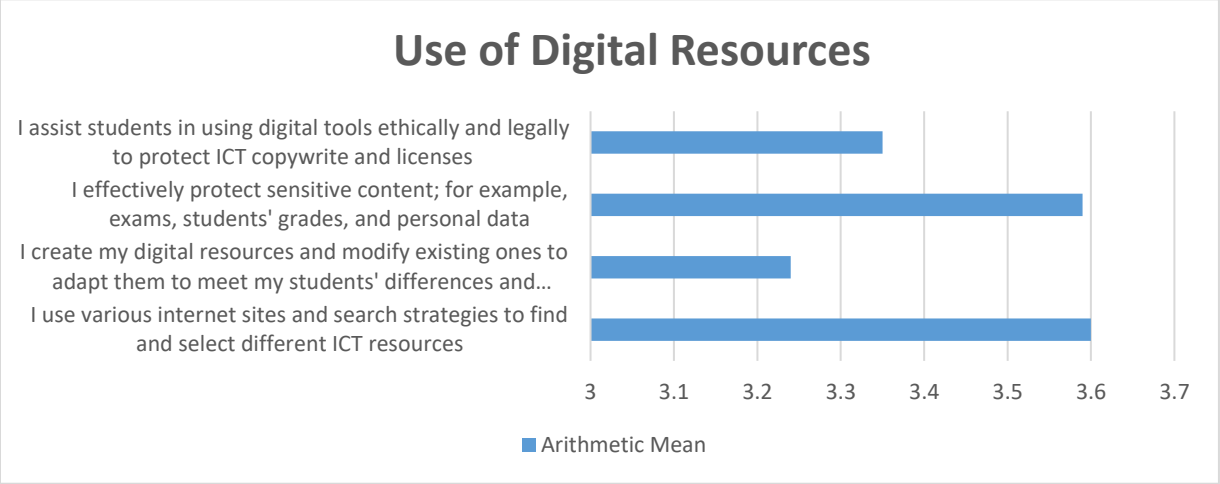

Figure 5. Digital resources

Level Two: Professional Engagement

Arithmetic means, standard deviations, and the degree for the second level determined for validation of professional engagement as per the following.

Table 6 Professional Engagement

Professional Engagement Items	Arithmetic Mean	Standard Deviation	Degree
I officially use various ICT channels to enhance communication with students and fellow academics	3.38	1.317	Medium
I use ICT to work alongside colleagues inside and outside my educational organisation	3.40	1.348	High
I actively develop my ICT skills	3.53	1.331	High
I participate in online training opportunities	3.20	1.363	Medium
Over All	3.38	1.238	Medium

Table 6 indicates that the answers of the study sample towards professional engagement came to a medium degree, and the most approved items were (I actively develop my ICT skills) with a high degree, and the most unapproved items were (I participate in online trainings opportunities) with a medium degree. The professional engagement level correspondingly defenestrates the training and capacity building need at teacher's level.

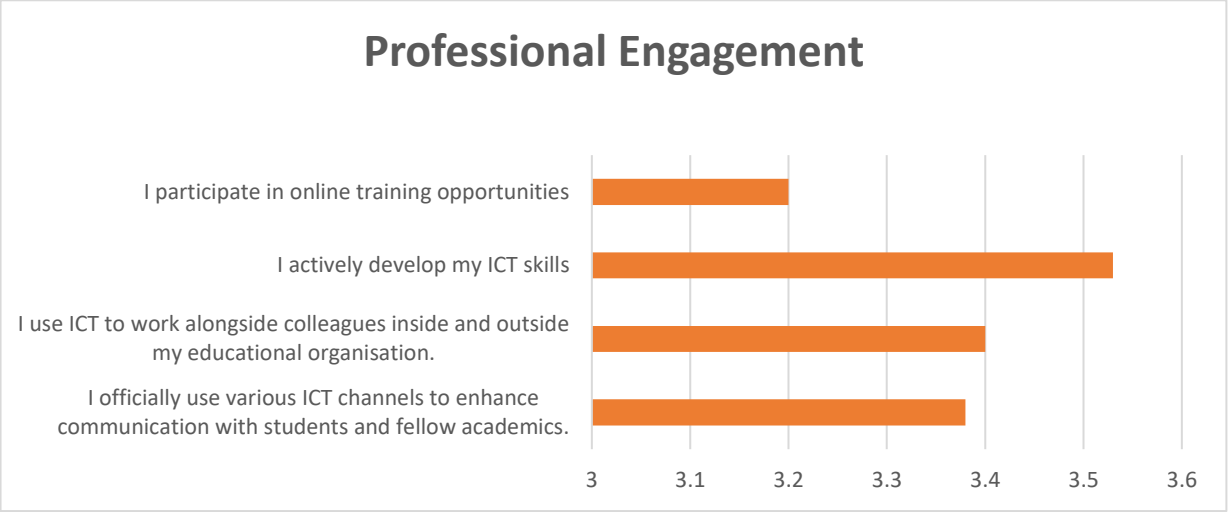

Figure 6. Professional Engagement

Level Three: Teaching and Learning

Arithmetic means, standard deviations, and the degree for the third level determined for validation of teaching and learning as per the following.

Table 7 Teaching and learning

Teaching and Learning Items	Arithmetic Mean	Standard Deviation	Degree
I carefully consider how, when, and why ICT be used in the classroom to ensure that it adds value	3.39	1.303	Medium
I monitor my students' activities and interactions systematically online.	3.21	1.253	Medium
When my students work in groups or teams, they use ICT to acquire and document evidence	3.18	1.255	Medium
I use ICT to allow students to plan, document and monitor their learning themselves	3.27	1.257	Medium
I use ICT to expand students' learning experiences through active engagement with experts, teams, and students locally and globally	3.26	1.272	Medium
I use ICT to design learning experiences that promote self-learning	3.25	1.226	Medium
I apply ICT principles to create innovative digital learning environments which support teaching and learning	3.28	1.249	Medium
Overall	3.26	1.153	Medium

Table 7 indicates that the responses of the study sample towards teaching and learning came in a medium degree, and the most approved paragraphs were (I carefully consider how, when, and why ICT be used in the classroom to ensure that it adds value) and in a medium degree.

The most unapproved paragraphs are (When my students work in groups or teams, they use ICT to acquire and document evidence) and to a medium degree as well.

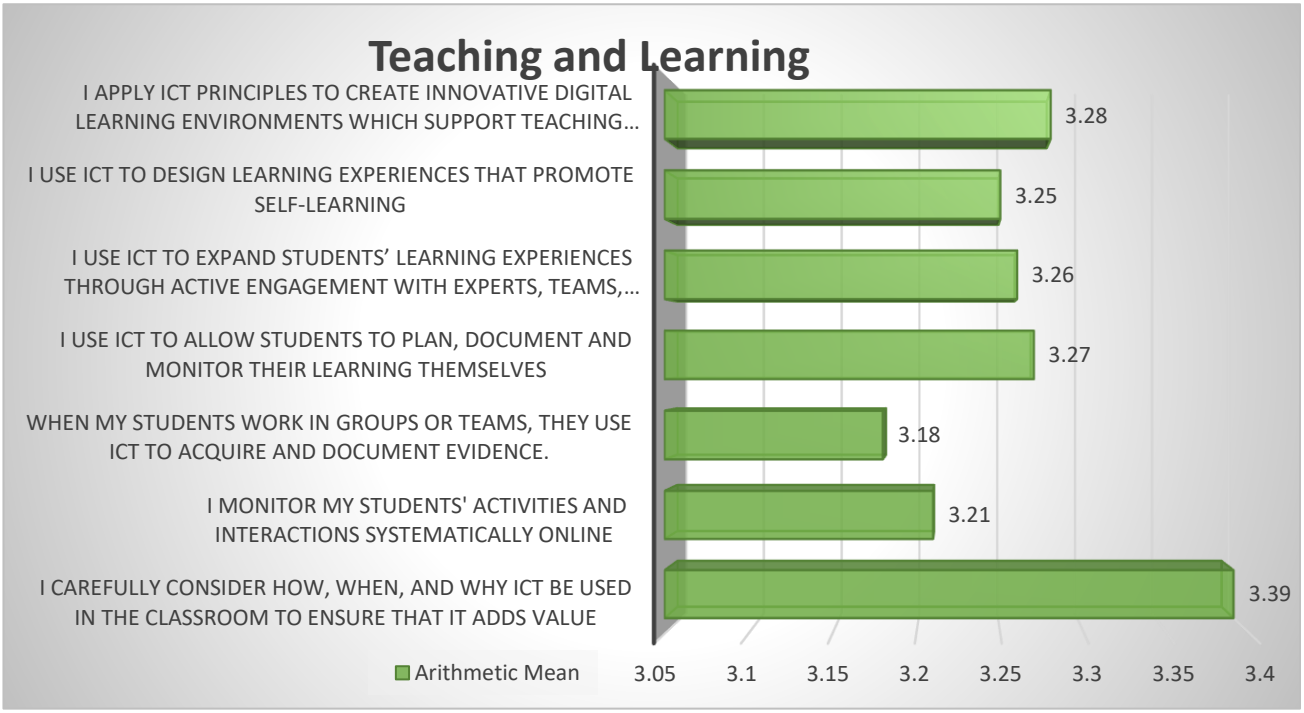

Figure 7. Teaching and learning

Level Four: Assessment

The following demonstrate the arithmetic means, standard deviations, and the degree for the fourth level for the validation of assessment.

Table 8 Assessment

Assessment Items	Arithmetic Mean	Standard Deviation	Degree
I use ICT to design and implement formative and summative assessments and feedback that meet students' needs	3.18	1.228	Medium
I analyse all the data available to me on time to identify students who need additional support	3.11	1.240	Medium
I use ICT to provide effective feedback	3.21	1.218	Medium
Over All	3.17	1.165	Medium

Table 8 indicates that the responses of the study sample towards the evaluation came in a medium degree, and the most approved items were (I use ICT to provide effective feedback) and in a

medium degree. The most unapproved items were (I analyse all the data available to me on time to identify students who need additional support) and to a medium degree.

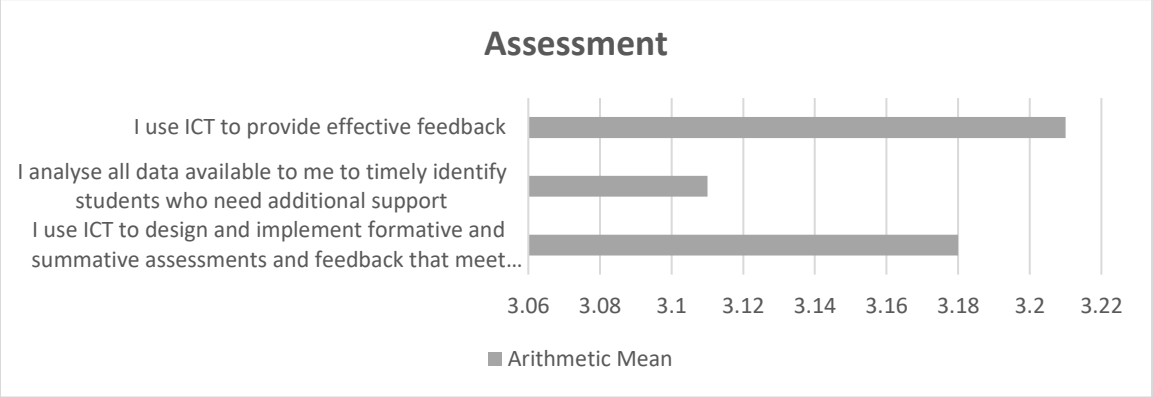

Figure 8. Assessment

Level Five: Empowering Learners

The following demonstrate the arithmetic means, standard deviations, and the degree for the fifth level for the validation of empowering learners.

Table 9 Empowering learners

Empowering Learners Items	Arithmetic Mean	Standard Deviation	Degree
When I create digital assignments for students, I consider and address potential digital problems	3.11	1.229	Medium
I use ICT to offer students personalized learning opportunities	3.25	1.229	Medium
I use ICT for students to participate in classes actively	3.31	1.254	Medium
Over All	3.22	1.1621	Medium

Table 9 indicates that the responses of the study sample towards the empowerment of learners came to a medium degree, and the most approved items were (I use ICT for students to participate in classes actively) and to a medium degree. The most unapproved items were (When I create digital assignments for students, I consider and address potential digital problems.) and to a medium degree.

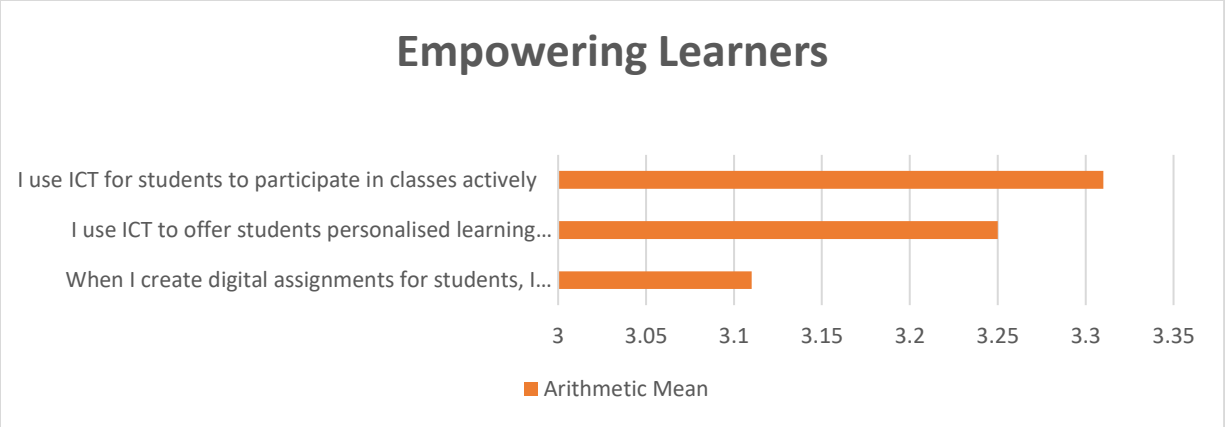

Figure 9. Empowering Learners

Level Six: Facilitating Learners' Digital Competence

The following demonstrate the arithmetic means, standard deviations, and the degree for the fifth level for the validation of facilitating learners' digital competence.

Table 10 Facilitating learners' digital competence

Facilitating Learners' Digital Competence Items	Arithmetic Mean	Standard Deviation	Degree
I teach students how to assess the information's reliability and to identify misinformation and bias	3.07	1.213	Medium
I set up assignments that require students to use ICT means to communicate and collaborate with each other or an outside audience	3.15	1.232	Medium
I set up assignments that require students to create digital content	3.09	1.255	Medium
I teach students how to behave safely and responsibly online	3.17	1.247	Medium
I encourage students to use ICT creatively to solve concrete problems	3.32	1.284	Medium
Overall	3.16	1.153	Medium

Table 10 indicates that the answers of the study sample towards the empowerment of learners came to a medium degree, and the most approved items were (I encourage students to use ICT creatively to solve concrete problems.) and to a medium degree. The most unapproved items were (I teach students how to assess the information's reliability and to identify misinformation and bias) and to a moderate degree as well.

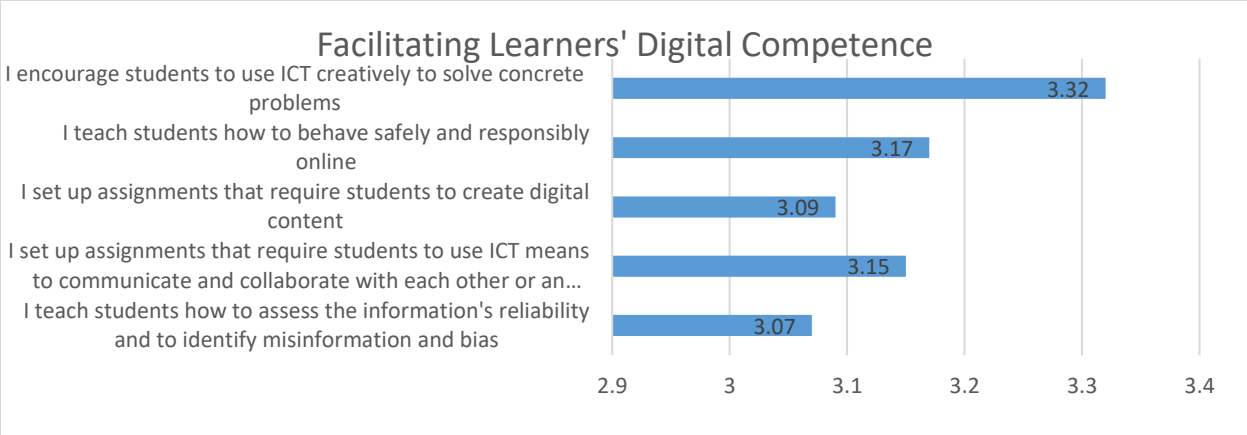

Figure 10. Facilitating learners' digital competence

University Students Digital Competencies Survey Results

This survey is divided into three sections as follows.

Part A: Contact Information & University
Part B: ICT Literacy
Part C: Students' proficiency in the use of ICT-based tools in teaching and learning.

The sample properties for Part A and Part B are illustrated as per the following.

Table 11 University students sample properties - Part I

Variable	Level	Frequencies	Percentage
Choose your university	University of Jordan (JU)	172	8.1%
	Irbid National University (INU)	531	25.0%
	Mutah University LTD (MU)	67	3.2%
	Al-Azhar University (AZHU)	462	21.8%
	Suez Canal University (SCU)	84	4.0%
	Heliopolis University Association (HUSD)	167	7.9%
	Palestine Technical University Kadoorie (PTUK)	230	10.8%
	Palestine Technical College – Dier Elbalah (PTC)	171	8.1%
	Al-Istiqlal University (PASS)	237	11.2%
College/Faculty	Engineering	108	5.1%
	Applied Sciences	29	1.4%
	Business and Economics	253	11.9%
	Agricultural Science and Technology	6	0.3%
	Arts and Educational Sciences (Humanities)	828	39.0%
	Information Technology	280	13.2%
	Graduate Studies	46	2.2%
	Physical Education and Sport Sciences	17	0.8%
	Pharmacy	13	0.6%

	Others	541	25.5%
Gender	Male	762	35.9%
	Female	1341	63.2%
	Prefer not to mention	18	0.8%
Age	18 - Less than 21	987	46.5%
	21 - Less than 25	821	38.7%
	25 - Less than 30	141	6.6%
	30 or above	155	7.3%
	Prefer not to mention	17	0.8%
Academic Level	Associate Degree	213	10.0%
	Bachelor	1804	85.1%
	Higher Diploma	65	3.1%
	Master	26	1.2%
	PhD	13	0.6%
I am currently enrolled in an ECE study programme	No	1305	61.5%
	Yes	816	38.5%
Overall		2121	100%

Table 11 University students sample properties - Part II

Variable	**Level**	**Frequencies**	**Percentage**
Computer and ICT Literacy	Poor	96	4.5%
	Basic	247	11.6%
	Good	1147	54.1%
	Excellent	631	29.8%
Computer Training	Non-formal (Self-Training)	1177	55.5%
	Formal (Professional Development)	621	29.3%
	None	323	15.2%
Years of Computer Use	Less than one year	354	16.7%
	1 - Less than 2 years	303	14.3%
	2 - Less than 3 years	258	12.2%
	3 - Less than 4 years	235	11.1%
	4 years or above	971	45.8%
Access to Internet	Faculty Library	93	4.4%
	Faculty e-learning Centre	133	6.3%
	Home	1872	88.3%
	Internet Café	23	1.1%
Frequency of Internet Use	Never	38	1.8%
	Once a week	86	4.1%
	Several times a week	284	13.4%
	Daily	1713	80.8%
Use of Email	Never	188	
	A few times a year	9	8.9%
	Monthly	252	0.4%
	Weekly	1623	11.9%
	Daily	49	76.5%
Total		2121	100%

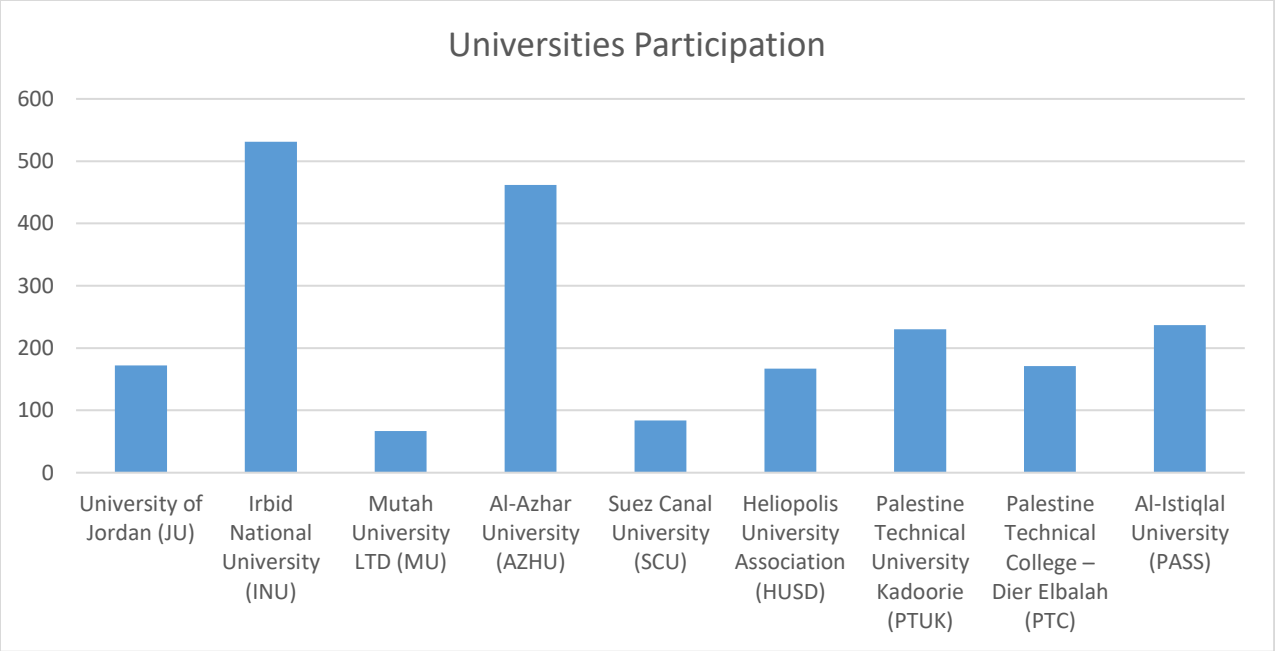

Figure 11. University participation for student samples

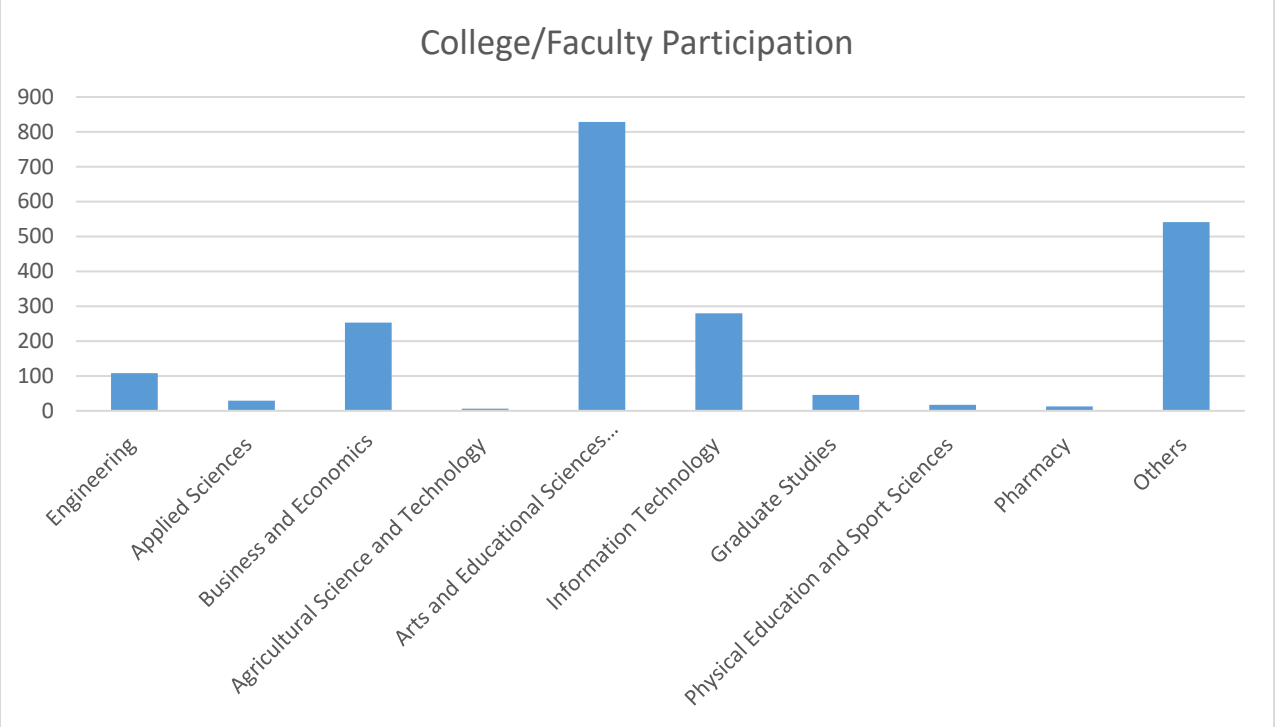

Figure 12. College/faculty participation for student samples

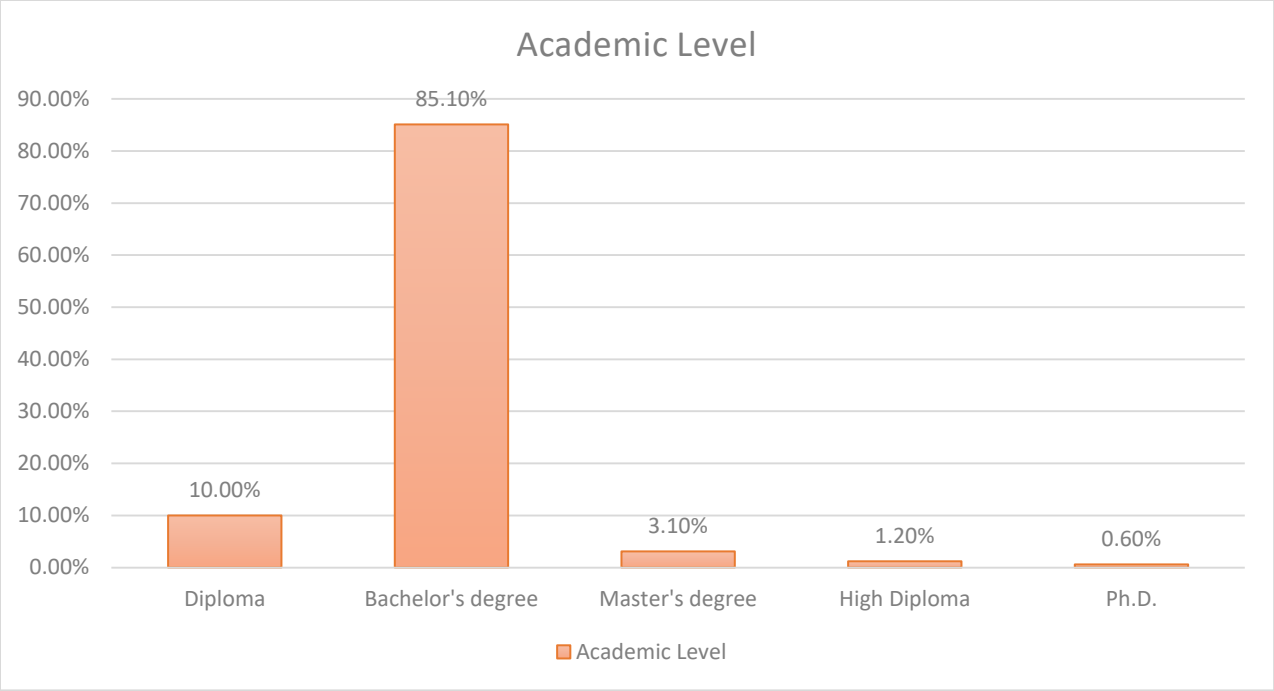

Figure 13. Academic level for student samples

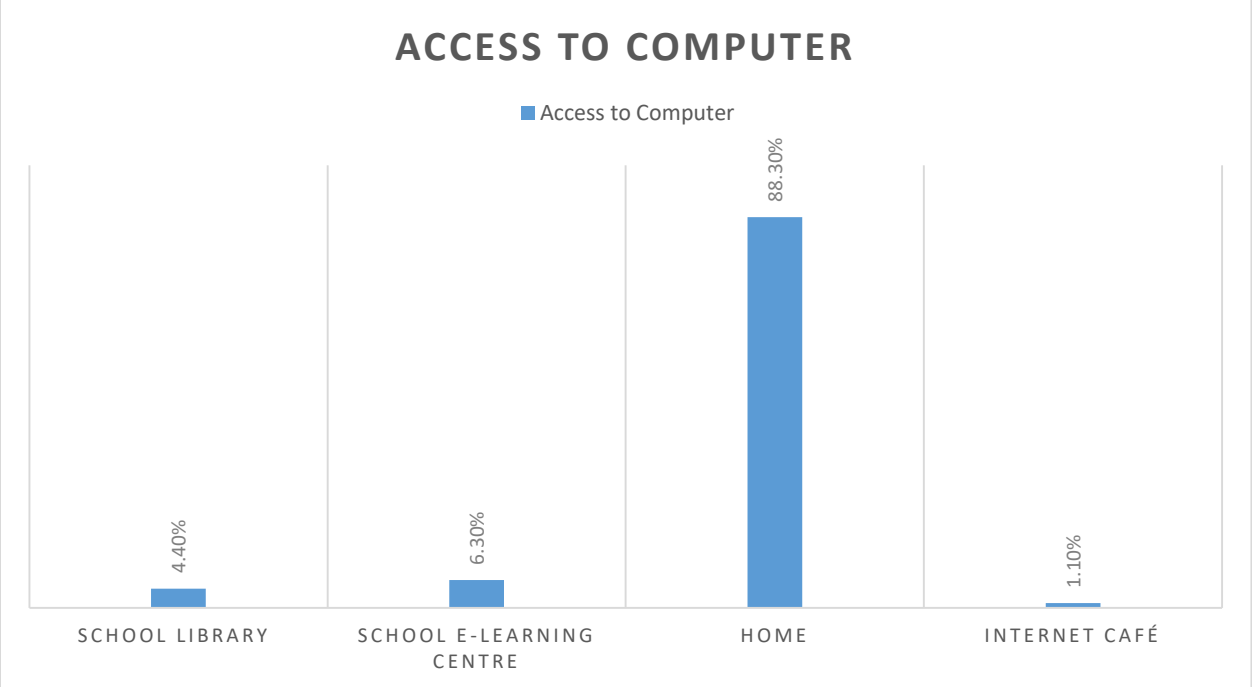

Figure 14. Access to computers for student samples

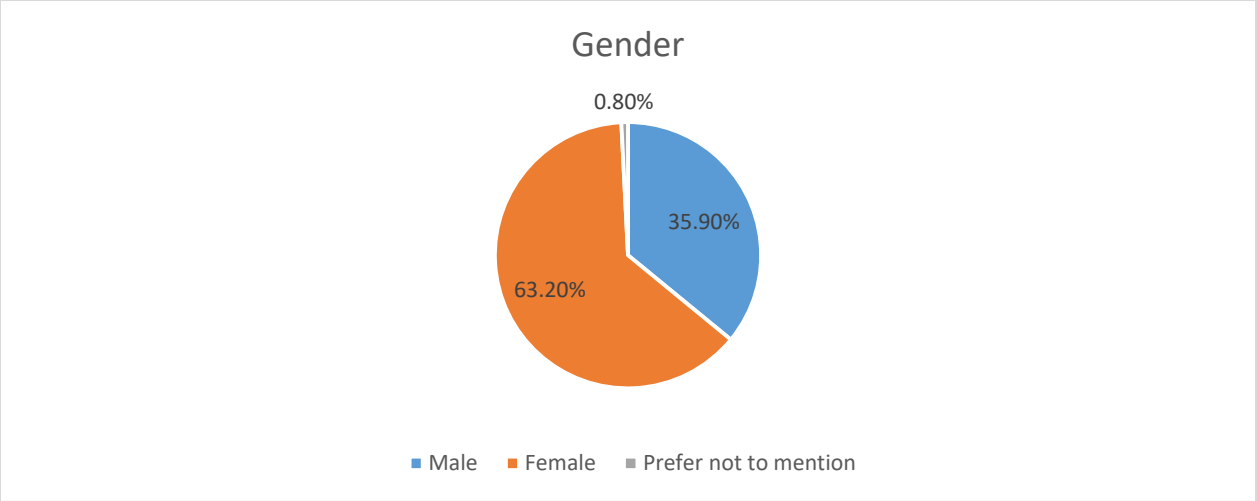

Figure 15. Gender for student samples

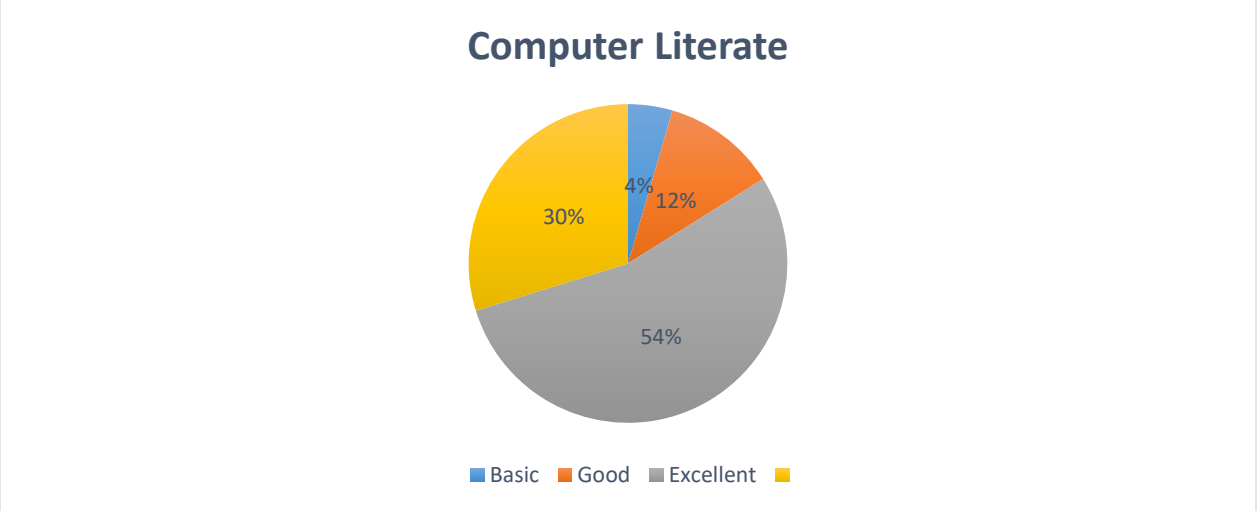

Figure 16. Computer literate for student samples

Stability of the student sample study tool

The stability was verified by calculating the stability Cronbach's Alpha equation. Cronbach's Alpha stability coefficient was calculated and this is evident from Table 12 below.

Table 12 Cronbach's Alpha stability values for the student's survey

Items	Number of Items	Cronbach's alpha values
Information and Data Literacy	3	.928
Communication and Collaboration	5	.939
Digital Content Creation and Learning	6	.929
Safety	4	.927

Problem Solving	3	928
Overall	21	.976

Table 13 Correction key to interpret the study paragraphs

Arithmetic Mean Period	Degree/Class
less than 1.8	Very low
1.8 - 2.59	Low
2.6 - 3.39	Medium
3.4 - 4.19	High
4.2 and above	Very High

The sample properties for Part C: Students' proficiency in the use of ICT-based tools in teaching and learning.

Level One: Information and Data Literacy

The following demonstrate the arithmetic means, standard deviations, and the degree for the first level for the validation of Information and Data Literacy.

Table 14 Information and data literacy

Information and Data Literacy	Arithmetic Mean	Standard Deviation	Degree
I use ICT resources for browsing, searching, and filtering data, information, and digital content.	2.87	1.509	Medium
I use ICT resources to manage data, information, and digital content.	2.73	1.445	Medium
I use ICT resources to evaluate data, information, and digital content.	2.73	1.432	Medium
Overall	2.78	1.367	Medium

Table 14 indicates that the study sample's responses towards students' efficiency in using tools based on Information and Data Literacy came to a medium degree, and the most approved items were (I use ICT resources for browsing, searching, and filtering data, information, and digital content.) and to a medium degree, and the most unapproved paragraphs, which are (I use ICT resources to manage data, information, and digital content) and to a medium degree.

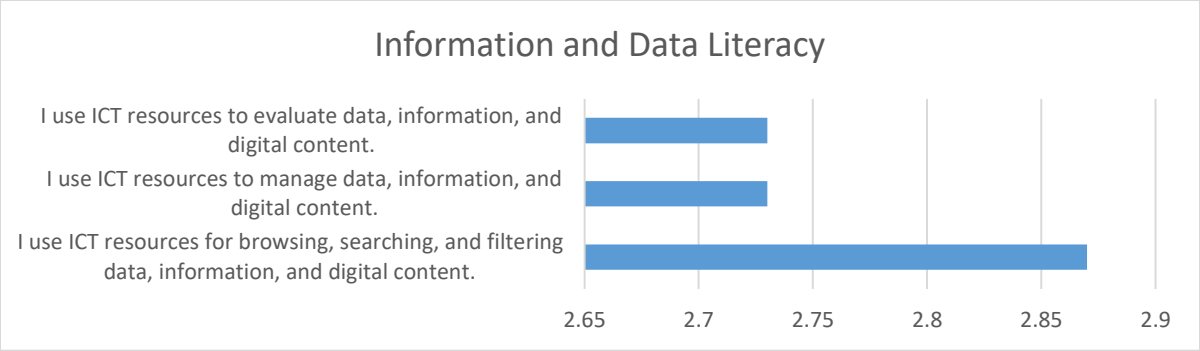

Figure 17. Information and data literacy

Level Two: Communication and Collaboration

The following demonstrate the arithmetic means, standard deviations, and the degree for the validation of the second level of communication and collaboration.

Table 15 Communication and collaboration

Communication and Collaboration	Arithmetic Mean	Standard Deviation	Degree
I collaborate with my teachers and classmates online.	2.91	1.500	Medium
I use ICT to prepare my course works and collaborate with my classmates and senior students.	3.00	1.508	Medium
I work with colleagues to accomplish course-works and assessments online.	2.91	1.497	Medium
I receive assessment feedback online.	2.79	1.444	Medium
I express myself creatively for a variety of purposes using ICT tools.	2.82	1.454	Medium
Overall	2.89	1.329	Medium

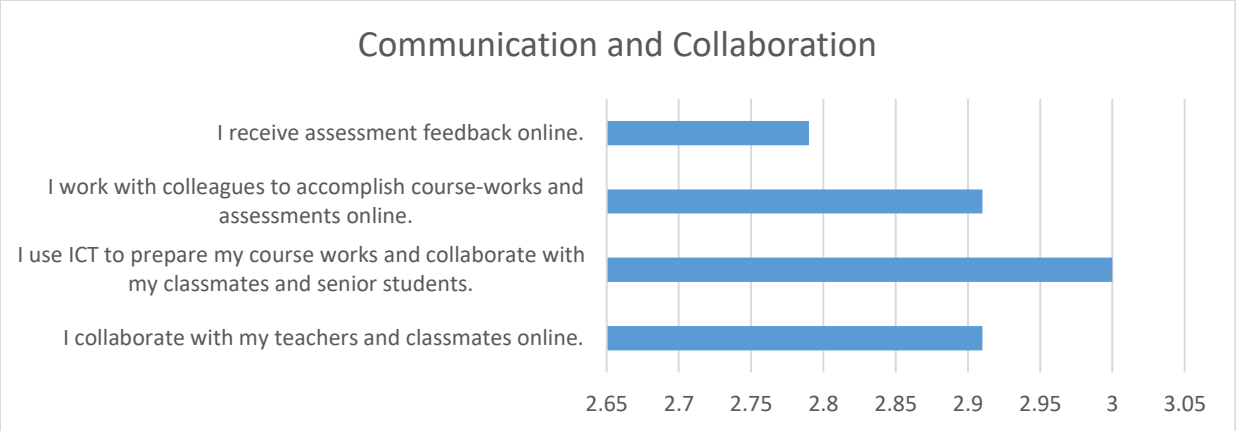

Figure 18. Communication and collaboration

Table 15 indicates that the answers of the study sample towards communication and collaboration came to a medium degree, and the most approved items were (I use ICT to prepare my course works and collaborate with my classmates and senior students.) and to a medium degree, and the most unapproved items were (I receive assessment feedback online) to an average degree.

Level Three: Digital Content Creation and Learning

The following demonstrate the arithmetic means, standard deviations, and the degree for the validation of the third level of digital content creation and learning.

Table 16 Digital content creation and learning

Digital Content Creation and Learning	Arithmetic Mean	Standard Deviation	Degree
I utilize ICT to accomplish my learning goals.	2.95	1.506	Medium
I work individually and in groups to accomplish courses works and assessments online.	2.94	1.459	Medium
I can create my digital content and modify existing one based on construct knowledge, produce creative artifacts, and make meaningful learning experiences.	2.71	1.406	Medium
I use internet search engines to find and select a range of ICT resources.	3.03	1.488	Medium
I am familiar with programming languages.	2.42	1.385	Medium
I know the importance of intellectual property rights in ICT.	2.93	1.505	Medium
Overall	2.83	1.253	Medium

Table 16 indicates that the answers of the study sample towards the digital content industry and learning came in a medium degree, and the most approved items were (I use internet search engines to find and select a range of ICT resources.) and in a medium degree, and the most unapproved items were (I am familiar with programming languages.) and to an average degree.

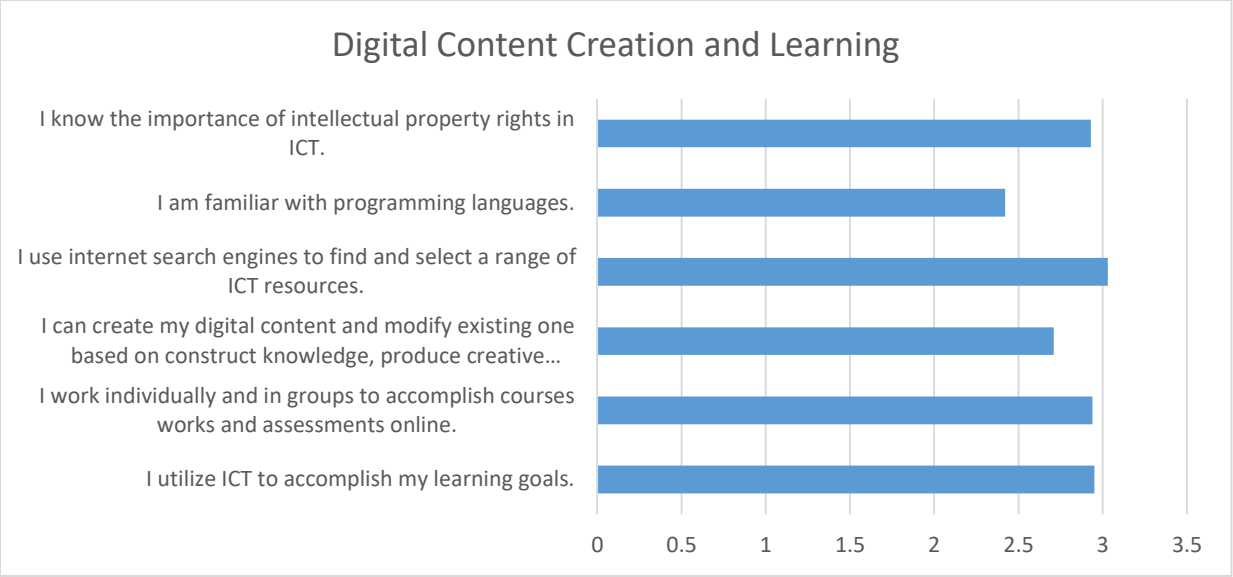

Figure 19. Digital content creation and learning

Level Four: Safety

The following demonstrate the arithmetic means, standard deviations for the validation of the degree of the fourth level called as safety.

Table 17 Safety

Safety	Arithmetic Mean	Standard Deviation	Degree
I know how to protect my computer from viruses	2.64	1.450	Medium
I effectively protect my personal data and digital content	2.83	1.457	Medium
I know how to find help and guidance to handle potential ICT and digital problems	2.82	1.454	Medium
I use ICT resources in a safe, legal, ethical, and healthy environment	3.04	1.530	Medium
Overall	2.83	1.334	Medium

Table 17 indicates that the answers of the study sample towards security came to a medium degree, and the most approved items were (I use ICT resources in a safe, legal, ethical, and healthy environment) and to a medium degree, and the most unapproved items were (I know how to protect my computer from viruses) and to an average degree.

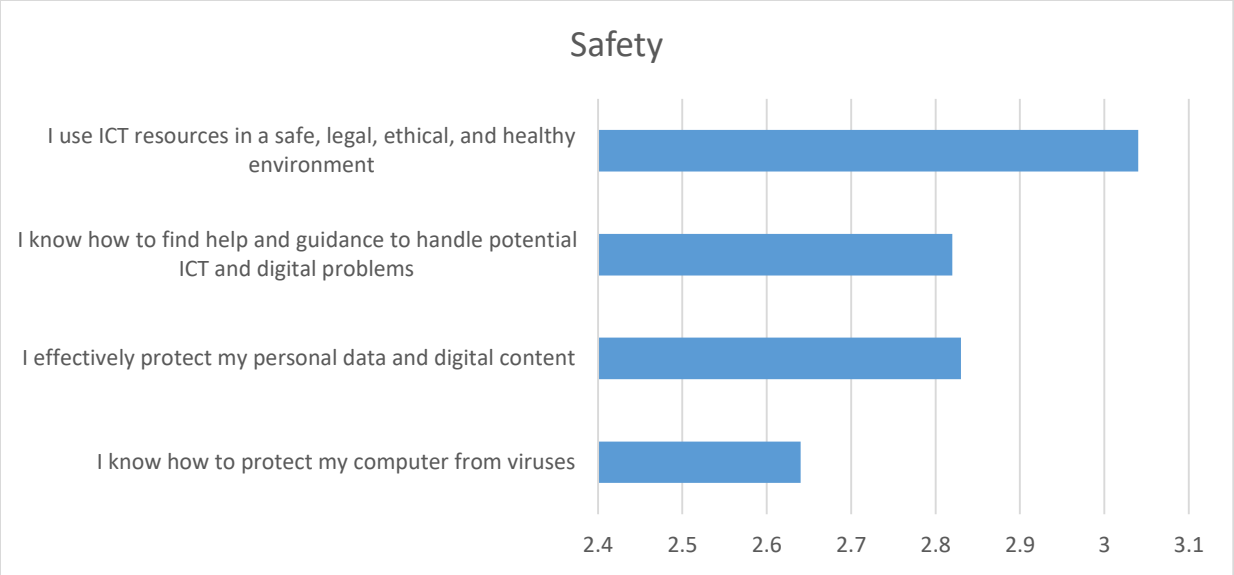

Figure 20. Safety

Level Five: Problem Solving

The following demonstrate the arithmetic means, standard deviations, and the degree for the validation of the fifth level for problem solving.

Table 18 Problem Solving

Problem Solving	Arithmetic Mean	Standard Deviation	Degree
I regularly use ICT in course-works and problem-solving activities	2.80	1.466	Medium
I use ICT to identify academic and technical needs.	2.85	1.445	Medium
I use ICT to create new ideas and digital content, such as online presentations and game creation.	2.91	1.475	Medium
Overall	2.85	1.367	Medium

Table 18 indicates that the answers of the study sample towards problem solving came to a medium degree, and the most approved items were (I use ICT to create new ideas and digital content, such as online presentations and game creation.) and to a medium degree, and the most unapproved items, which are (I regularly use ICT in course-works and problem-solving activities) with a moderate degree.

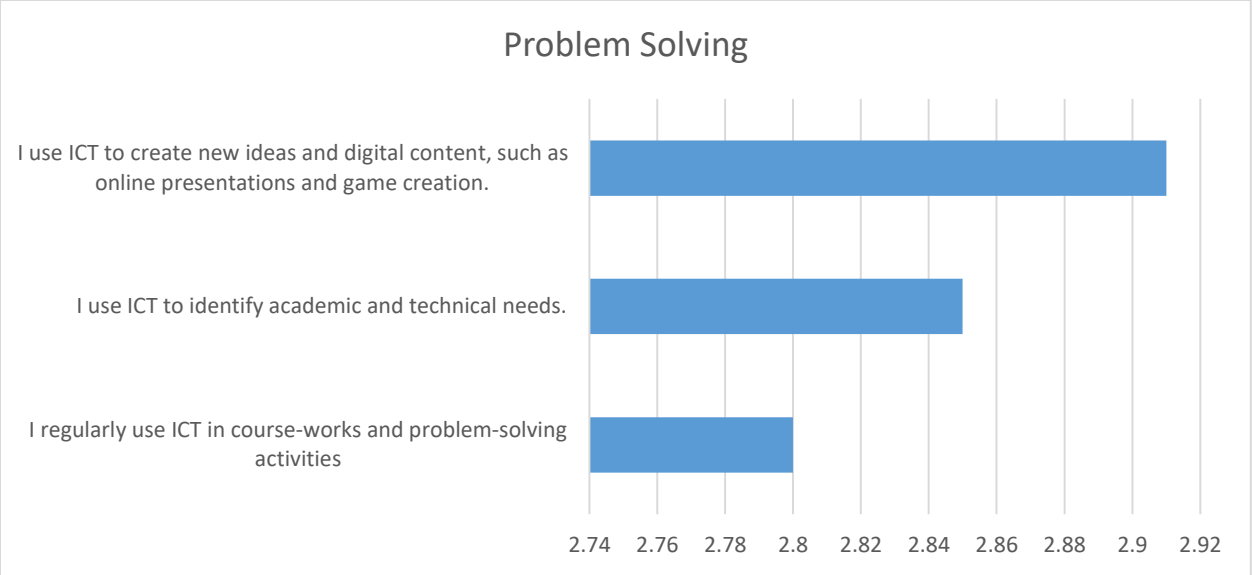

Figure 21. Problem Solving

ICT can impact student learning when teachers are digitally literate and appreciate how to integrate technology it into curriculum. Educators need to use a diverse set of ICT tools to communicate, create, disseminate, store, and manage information such as ebooks, and instructional software. In addition, technology can provide opportunities for students to collaborate and communicate with each other, create new ideas which on the other hand can enhance their learning and communication skills.

Overall, ICT training for teachers can have a positive impact on the learning experience of students and help them achieve their academic goals. Through the use of ICT tools, teachers can educate their students on a variety of issues, measure their learning progress, and even enhance their learning. ICT tools can also help improve students' understanding, which can result in better leaning outcomes.

In order to answer whether there are differences between the sample answers about the students' competencies due to the variable of teaching in the early childhood program, the following group statistics were calculated.

Table 19 Group statistics for students' competencies – I

I am currently teaching in an ECE study programme?		N	Mean	Std. Deviation	Std. Error Mean
MEAN A	Yes	816	2.6683	1.37838	0.04825
	No	1305	2.8450	1.35541	0.03752
MEAN B	Yes	815	2.7540	1.35940	0.04762
	No	1305	2.9712	1.30267	0.03606
MEAN C	Yes	815	2.7109	1.27061	0.04451
	No	1305	2.9026	1.23657	0.03423
MEAN D	Yes	815	2.6429	1.32385	0.04637
	No	1305	2.9466	1.32803	0.03676
MEAN E	Yes	815	2.7162	1.39081	0.04872
	No	1305	2.9384	1.34506	0.03723

Table 20 Group statistics for students' competencies – II

		t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
MEAN A	Equal variances assumed	-2.901	2119	0.004	-.17665	0.06089
MEAN B	Equal variances not assumed	-3.635	1672.072	0.000	-.21714	0.05973
MEAN C	Equal variances not assumed	-3.414	1692.192	0.001	-.19167	0.05615
MEAN D	Equal variances assumed	-5.127	2118	0.000	-.30361	0.05922
MEAN E	Equal variances not assumed	-3.625	1683.997	0.000	-0.22229	0.06132

According to the group statistics identified in Table 19 and Table 20, it is clear that the levels of significance for all axes of students' competencies are less than their value (0.05), which indicates the existence of differences between students affiliated with the early childhood program and those who are not affiliated. That is, the differences are in favor of unaffiliated students.

Furthermore, in order to answer whether there are differences between the sample answers about teachers' competencies due to the variable of teaching in the early childhood program, the following group statistics were calculated.

Table 21 Group statistics for teachers' competencies – I

	I am currently teaching in an ECE study programme?	N	Mean	Std. Deviation	Std. Error Mean
Mean A	Yes	105	3.0429	1.07722	0.10513
	No	285	3.5904	1.23742	0.07330
Mean B	Yes	104	3.0096	1.16425	0.11416
	No	285	3.5096	1.23838	0.07336
Mean C	Yes	104	2.9684	1.04675	0.10264
	No	285	3.3704	1.17267	0.06946
Mean D	Yes	104	2.8109	1.04769	0.10273
	No	285	3.2982	1.18064	0.06994
Mean E	Yes	104	2.8910	1.12291	0.11011
	No	285	3.3450	1.15430	0.06837
Mean F	Yes	104	2.8500	1.07964	0.10587
	No	285	3.2730	1.15965	0.06869

Table 22 Group statistics for teachers' competencies – II

		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Mean A	Equal variances not assumed			-4.272	211.402	0.000	-0.54749	0.12816
Mean B	Equal variances assumed	1.573	0.211	-3.580	387	0.000	-0.50003	0.13966
Mean C	Equal variances assumed	3.532	0.061	-3.077	387	0.002	-0.40202	0.13066
Mean D	Equal variances assumed	2.573	0.110	-3.710	387	0.000	-0.48735	0.13137
Mean E	Equal variances assumed	0.132	0.717	-3.458	387	0.001	-0.45400	0.13129
Mean F	Equal variances assumed	1.692	0.194	-3.242	387	0.001	-0.42298	0.13047

According to the group statistics identified in Table 21 and Table 22, it is clear that the levels of significance for all axes of employee competencies are less than their value (0.05), which indicates the existence of differences between employees in the Early Childhood Program and employees in other educational programs. The differences are in favor of employees in other university programs.

Concluding Remarks and Recommendation

There are many benefits of ICT in education. ICT in education can support, enhance, and optimize the delivery of information. The teachers and students ICT competencies survey has shown that ICT can lead to improved student learning and to a better teaching method provided that teachers and students receive better ICT training and ICT infrastructure. Some advantages include students'

engagements such that they are generally more focused and attentive when there's technology involved compared to the traditional way of learning and learning. Moreover, is essential to bridge the gap between the market needs and the skills and competences delivered by the university programs. For example, children begin their education with varying degrees of technology literacy due to the increasing presence of ICT around them. Therefore, educators and university students should be equipped with an up-to-date ICT skills and tools. Based on the conducted survey, the implementation for ICT4EDU project should implement the following aspects in order to foster ICT competencies among students and teachers' community.

1- Provide capacity building for teachers on relevant ICT competencies such as using ICT in education effectively, ICT based curriculum and assessments, pedagogy, digital skills, and teacher professional learning.
2- Educators should be trained to create digital resources to adapt with students' learning needs and learning styles.
3- Educators should actively participate in online trainings and capacity building opportunities.
4- ICTs should be used in the classroom to ensure that it add value to students and to identify students who need additional support.
5- To enhanced ICT competencies for students through collaboration and communication using a computer and the internet, enhance students' ability to process data and information using presentation software, digital cameras, video cameras, programmable toys, and many other devices and ICT resources.
6- Students need more focus training on how to use ICTs to assess the information's reliability and to identify misinformation and bias.
7- Integrate ICT in student's curriculum to impact student learning using diverse set of ICT tools to communicate, create, disseminate, store, manage data and information.

References

Nannally, J. C., & Bernstein, I. H. (1994). *Psychometric theory (3rd ed.)*. New York: McGraw-Hill.