Bulletin of Education and Research
August 2024, Vol. 46, No.2 pp. 107-121

Authentic Assessment of 21st Century Skills in Students of Higher Education in Distance Learning / Blended Learning Mode

Nasir Mahmood* and Tooba Saleem**

Abstract

The major objective of the research was to examine the utility of authentic assessment tools using the technology gadgets and their value in addition to the assessment of 21st-century skills under the umbrella of 21st century skills. These five domains: a) Critical and innovative thinking skills b) Interpersonal skills c) Intrapersonal skills d) Global Citizenship e) Media and Literacy Skills were assessed under the umbrella of 21st century skills. Secondly, to determine the acquaintance of subjects with the technology embedded assessment tools, ICT literacy level of students was also assessed. The study was developmental in nature; panel survey design was used to examine the utility of authentic assessment tools using technology gadgets and their value addition for the assessment of 21st century skills through different authentic assessment tools, over a period of two semesters. Through the period of intervention data were collected from a sample of postgraduate level students enrolled under the blended learning program at Allama Iqbal Open University, Islamabad. A total of 25 M.Phil. students experienced the intervention. A significant positive change was observed in the development of students' ability to draw conclusions (p= .004), decision making (p=.013) and implementing new ideas (p=.000) was observed in post-test under the investigation of critical and innovative thinking skills. Moreover, it was also found that the ability to be persistent showed significantly positive improvement in the post-test scores of learners in online learning management system (p=.001). Global Citizenship values (p=.037) was significantly improved among the learners after intervention (p<.05).

Keywords: Assessment, blended learning mode, distance learning, 21 century skills

* Dean Faculty of Education, Allama Iqbal Open University, Islamabad, Pakistan email: nasir.mahmood@aiou.edu.pk
** Lecturer, Faculty of Education, Allama Iqbal Open University, Islamabad, Pakistan

Introduction

With continuously increasing number of entrants in higher education institutions there has been observed a shift among learning institutions from traditional learning environment to Blended learning environments. Blended learning environments have become a "new normal" in university course delivery (Dziuban et al, 2013).

The technological innovation is also changing the way that universities teach and students learn. Hence, the distance education, sophisticated learning-management systems and the integration of different assessment tools transforming the nature of assessment which the universities are embracing.

For the academic institutions, charged with equipping graduates to compete in today's knowledge economy, the possibilities are great. Furthermore, irrespective of these factors at the end of system, the development as well as the assessment of higher order thinking skills which are also called life skills and employability related traits is at the core of higher education level programs. Moreover, there is growing recognition that individuals need a wide array of skills in order to meet the needs of modern workplace. In this context, our existing assessment procedures are unable to measure the 21st century skills and traits with traditional assessment procedures.

Even, the contemporary technology embedded assessment strategies also need to extend the nature of tools and their range to measure the compatibility between the reported competence level and the actual competence level of the students at higher education level students.

Objectives of the Study

The major objective of the research was to examine the utility of authentic assessment tools using the technology gadgets and their value in addition to the assessment of 21st century skills under the umbrella of 21st century skills. These five domains are: (a) Critical and innovative thinking skills, (b) Interpersonal skills 3) Intrapersonal skills 4) Global Citizenship 5) Media and Literacy Skills were assessed using Learning Management System (LMS) as medium.

1. To examine the effect of devised authentic assessment tools for measuring the 21stcentury skills among the students of blended learning program.

Hypotheses

H_{01}There is no significant difference between the pre-intervention and post-intervention mean scores of students on the scale measuring 21st century communication skills.

H_{02}There is no significant difference between the pre-intervention and post-intervention mean scores of students on the scale measuring media and information literacy skills.
H03 There is no significant difference between the pre-intervention and post-intervention mean scores of students on the scale critical thinking skills.
H04 There is no significant difference between the pre-intervention and post-intervention mean scores of students on the scale measuring communication skills.

Methodology

The researcher employed quantitative research approach and intended to develop 21st century skills using authentic assessment and measuring them through empirical tools based on 21st century skills framework (UNESCO, 2010) among the MPhil level students in Blended learning program.

Research Design

The study was developmental in nature, cohort panel survey was designed to examine the appropriateness of authentic assessment tools using the technology gadgets and their value addition to the assessment of 21st century skills, over a period of two semesters. The essential feature of this design is that it provides repeated observations on a set of variables for the same sample unit over time (Lavrakas, 2008).

Sample of the Study

Through the period of intervention data was collected from a sample of 25 postgraduate level students enrolled under the blended learning program at Allama Iqbal Open University, Islamabad. The students were enrolled in M.Phil. Education program.

Instrumentation

Two sets of tools were developed for conducting this study. These two sets of tools included set of:

1. 21st century Skills Assessment Questionnaires

2. Authentic Assessment Tasks (open book paper, quizzes and discussion board)

Set of questionnaires were developed measuring 21st century skills under these dimensions: i) Critical and innovative thinking ii) Interpersonal skills iii) Intrapersonal skills iv) Global citizenship and v) Media and information literacy. For the development of questionnaires, UNESCO's framework of 21st century skills were used and framework

for each questionnaire was developed and items were developed against the identified indicators (see annexure "set of tool framework"). List of 21st century skills which were measured through the set of questionnaires are as follows:

Table 1: 21st Century Skills Framework

Domains	Examples of key skills, competencies, values and attitudes
Critical and innovative thinking	Creativity
	Decision - making
	Entrepreneurship
	reflective thinking
	resourcefulness
	reasoned application skills
Interpersonal skills	Communication skills
	Teamwork
	collaboration
	sociability collegiality
	empathy
	compassion
	organizational skills
Intrapersonal skills	Self- discipline,
	flexibility and adaptability
	ability to learn independently, perseverance
	self-awareness
	compassion
	self-respect
	self-motivation
	integrity
Global citizenship	Awareness
	intercultural understanding
	ethical understanding responsibility
	tolerance
	openness
	respect for diversity
	respect for the environment
	national identity
	democratic participation conflict resolution
	sense of belonging
Media and information literacy	Ability to obtain information through ICTs
	analyze information through ICTs
	evaluate information and media content
	ethical use of ICT

Source: (UNESCO, 2010)

Authentic Assessment Tools

As the study was proposed to examine the Authentic Assessment of 21st century skills for which the other set of Authentic Assessment tools were developed. This is a form of assessment in which students are asked to perform the tasks that demonstrate meaningful application of essential knowledge and skills -- Engaging in problems or questions of importance, in which students use knowledge effectively and creatively. These tools were used for both formative and summative purposes as part of intervention to develop and improve 21st century skills under the following domains of skills.

Table 2: Authentic Assessment Techniques for Measuring 21st Century Skills

21st century skills*	Authentic Assessment techniques
Cognitive skill	
Non routine problem solving	Problem Based Learning(term paper and open book test)
Critical thinking	Discussion boards, reflective notes
Systems thinking	Quizzes
Interpersonal skills	
Complex communication	Discussion boards(blogs)
Social skills	Discussion boards(blogs)
Teamwork	Term papers, Peer Assessment
Dealing with diversity	Peer Assessment
Intrapersonal skills	
Self-management	Quizzes, Open book test, Self-assessment
Time management	Quizzes, Open book test
Self-development	Self-assessment
Self-regulation	Open book test
Adaptability	Open book test
Concentration	Discussion boards(blogs), Open book test

*(National Research Council, 2008)

Procedure of the Study

After the selection of the sample their level of 21st century skills were assessed before giving them authentic assessment tasks. During the semester students were assessed through formative and summative authentic assessment tools. Further, online support was given by the course coordinator to the students included in the sample of the study. Learning Management System (LMS) was utilized to execute the assessment tools. Feedback was provided on each assessment. As the study was developmental in nature, after the implementation of authentic assessment tasks, a post-test was taken to compare the students' level of 21st century skills with their baseline level.

The intervention consisted of ten authentic assessment tasks which were uploaded on LMS during intervention. These tasks were developed by researchers and presented to students after the expert review of university teachers from the field of educational assessment. These tasks consisted of activities related to the application of research concepts into actual situations. The basic reading material related to course contents and supplementary materials were developed and authentic assessment tasks for developing 21st century skills were uploaded on LMS. In the month of June 2021, the intervention was started, which prolonged over a period of three months. The purpose of giving these authentic assessment tasks to students was the development of critical thinking, communication, and global citizenship skills among distant learners.

The provided tasks were framed under these dimensions. On the other side, for the assessment of these skills, self-reported questionnaires were developed for students and were filled before and after the presentation of intervention tasks. Before final conduct of 21st century assessment tools, pilot testing of questionnaires was done, and these were checked for their reliability. The data thus generated was used to examine the psychometric properties of questionnaire items and validated for the appropriateness of these tools for assessing the 21st century skills in online learning environment. A post-test of 21st century skill was also taken after the completion of tasks given to students and results were compared with the pre-test. The major findings of the study revealed most of the students enrolled in blended learning program were found basic ICT literate.

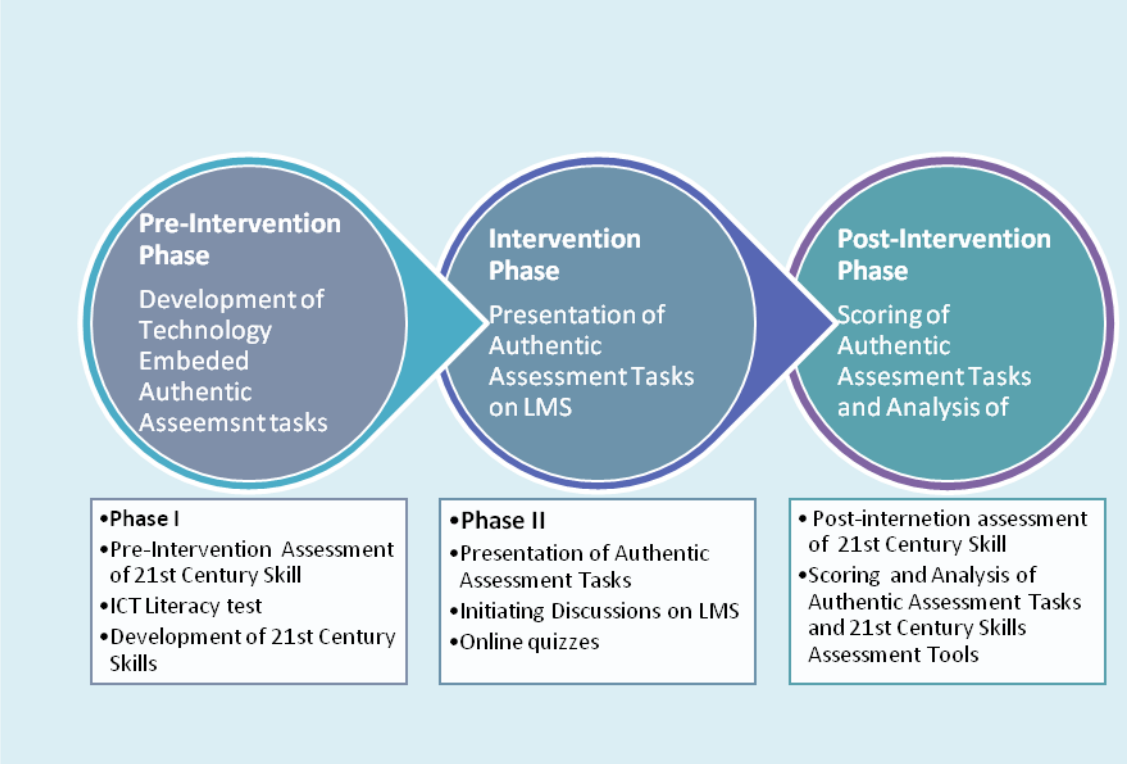

Figure 1: Procedure of the Study

Phase I

In phase I of the study, firstly the basic acquaintance of students with use of ICT was assessed through ICT Literacy Test (mentioned in instrumentation section). The self-constructed set of authentic assessment tools was piloted on the postgraduate level students (N=203) from the formal universities of Islamabad. Following are the details of content validation and pilot testing of tools with the basic analysis.

Phase II

The data thus generated were used to identify the indicators for technology embedded authentic assessment tools to measure the appropriateness of tools and value addition to erasure 21st century skills. A post-test of 21st century skill will be taken and results were compared with the pre-test.

Finally, after one semester the impact of intervention and appropriateness of assessment skills for developing 21st century skills was examined through again conducting the 21st century skills assessment tools.

Data Analysis and Results

Pre-test and Post-test Comparison of 21st Century Skills in ODL Students

In this section Pre-test Post-test Comparison of five different 21st century skills are presented as result of 16 weeks intervention through ten authentic assessment tasks that were presented to students during semester using the interface of learning management system (LMS).

Table 3

Pre-test Post-test Mean score Comparison of Media and Information Literacy Skills of MPhil Students

Subscale	Groups	N	*M*	SD	*t*	*df.*	*p*
1.Obtaining Information through ICTs	Pretest	21	17.6190	4.38721	1.515	20	.145
	Post-test	21	16.4286	3.47234			
2.Critically Analyze Information	Pretest	21	20.1429	3.81164	.203	20	.841
	Post-test	21	19.9048	3.61808			
3.Ethical Use of ICTs	Pretest	21	9.7143	2.96889	.060	20	.953
	Post-test	21	9.6667	2.17562			

Paired sample t-test was conducted to measure change in the level of Media and Information Literacy Skills after going through an intervention of completing ten authentic assessment tasks. The result of the test revealed no significant difference in the development of students ability to obtain Information through ICTs (p=.145) critically analyze information (p=.841) and the ethical use of ICTs (p=.953).

Table 4

Pre-test Post-test Mean Score Differences on the Basis of Critical and Innovative Thinking Skills of MPhil Students

Subscale	Groups	N	*M*	SD	*t*	*df.*	*p*
1.Look for Evidence	Pretest	21	43.6190	5.35235	1.913	20	.070
	Post-test	21	40.0952	8.44337			
2.Draw Conclusion	Pretest	21	110.6190	9.58893	2.902	20	**.009**
	Post-test	21	98.3810	17.02491			
3.Decision Making	Pretest	21	72.8000	7.20088	2.622	19	**.017**
	Post-test	21	64.2000	13.18931			
4. Implementing New Ideas	Pretest	21	90.8000	8.14087	2.228	19	**.038**
	Post-test	21	83.0000	14.48774			

Paired sample t-test was conducted to measure change in the level of critical and innovative thinking skills after going through an intervention of completing authentic assessment tasks. The results highlighted a significant positive change in the development of students ability to draw conclusions (***p*=.004**), decision making (***p*=.013**) and Implementing new ideas (***p*=.000**). The space for creativity and implementing new ideas in given assignment tasks helped students to enhance critical and innovative thinking skills using learning management system at Allama Iqbal Open University, Islamabad.

Table 5: Pre-test Post-test Mean Score Differences on the Basis of Intrapersonal Skills of MPhil Students

Subscale	Groups	N	*M*	SD	*t*	*df.*	*p*
1. Self Discipline	Pretest	22	34.7727	2.15874	2.014	21	.057
	Post-test	22	32.6818	4.68418			
2.Learn Independently	Pretest	22	31.0455	3.19936	-.798	21	.434
	Post-test	22	31.8636	3.77076			
3.Flexibility and Adaptability	Pretest	22	16.5455	2.66775	-1.545	21	.137
	Post-test	22	18.0000	2.77746			
4.Self Awareness	Pretest	22	14.6818	2.95016	-1.775	21	.090
	Post-test	22	16.2727	3.08887			
5. Perseverance	Pretest	22	8.5455	2.01724	-3.833	21	**.001**
	Post-test	22	11.0000	3.03942			
6.Self Motivation	Pretest	22	7.2273	1.57153	-1.339	21	.195
	Post-test	22	7.9545	1.52682			
7.Compassion	Pretest	22	7.5455	2.44418	-1.312	21	.204
	Post-test	22	8.4545	3.18818			
8.Integrity	Pretest	22	9.0909	2.58031	-.510	21	.615
	Post-test	22	9.5000	2.28348			
9.Risk Taking	Pretest	22	11.9091	3.17594	-1.222	21	.235
	Post-test	22	12.7727	2.68916			
10.Self Respect	Pretest	22	9.5455	2.08686	-1.602	21	.124
	Post-test	22	10.5455	2.97173			

Paired sample t-test was conducted to analyze the difference in the level of Intrapersonal skills after going through an intervention of completing authentic assessment tasks during a whole semester. The result given in the above table highlighted that there was not any significant difference in the development of intrapersonal skills among the students a result of intervention. Furthermore, on the subscale of self discipline (*p*=.057) learn independently (*p*=.434) flexibility and adaptability (*p*=.137), self awareness (*p*=.090), Perseverance (*p*= **.001**) self motivation (*p*=.195), compassion (*p*=.204), integrity (*p*= .615), risk taking (*p*= .235), self respect (*p*=.124), were found in

significant (p<.05). •The only subscale perseverance, the ability to be persistent showed significantly positively improved score of learners in online learning management system (p=.001) after intervention under the investigation of intrapersonal skills.

Table6:

Pre-test Post-test Mean Score Differences on the Basis of Interpersonal Skills of MPhil Students

Subscale	Groups	N	*M*	SD	*t*	*df.*	*p*
1.Communication Skills	Pretest	22	47.1364	4.31272	1.722	21	.100
	Post-test	22	44.9545	6.62231			
2.Collaboration	Pretest	22	41.8182	5.10496	1.046	21	.307
	Post-test	22	40.4545	6.10017			
3.Empathy	Pretest	22	30.7727	4.95630	.865	21	.397
	Post-test	22	29.3636	6.36617			
4.Cultural Diversity and Sensitivity	Pretest	22	36.0455	3.57874	.000	21	1.000
	Post-test	22	36.0455	5.49005			

Paired sample t-test was conducted to analyze the difference in the level of Interpersonal skills of open and distance learners after going through an intervention of completing authentic assessment tasks during a whole semester. The result given in the above table highlighted that there was not any significant difference in the development of intrapersonal skills among the students a result of intervention. Furthermore, on the subscale of Communication Skills (*p*=.100) Collaboration (*p*=.307) empathy (*p*=.397) and cultural diversity and sensitivity (*p*=1.000) did not improve score of learners in online learning management system after the intervention of whole semester.

Table7:

Pre-test Post-test Mean Score Differences on the Basis of Global Citizenship Skills of MPhil Students

Subscale	Groups	N	*M*	SD	*t*	*df.*	*p*
1.Awareness	Pretest	22	21.6364	3.79907	2.231	21	**.037**
	Post-test	22	22.3182	4.44422			
2.Tolerance	Pretest	22	10.7273	3.28317	-1.026	21	.316
	Post-test	22	11.5000	2.93987			
3.Openess	Pretest	22	44.8182	6.39670	-.132	21	.896
	Post-test	22	45.0455	6.60791			
4.Responsibility	Pretest	22	8.0455	2.14869	-.650	21	.523
	Post-test	22	8.3636	1.78740			
5.Respect for Diversity	Pretest	22	41.6818	6.04260	.355	21	.726
	Post-test	22	41.1364	5.04546			
6.Ethical Understanding	Pretest	22	17.7727	2.81039	2.036	21	.055
	Post-test	22	16.3636	2.82076			

7.Intercultural Understanding	Pretest	22	21.3636	3.71029	.478	21	.637
	Post-test	22	20.9091	2.89349			
8.Democratic Participation	Pretest	22	7.6818	1.24924	.388	21	.702
	Post-test	22	7.5000	1.59613			
9. Conflict Resolution	Pretest	22	18.7727	4.03475	-1.605	21	.123
	Post-test	22	20.2727	2.49154			
10.Respect for Environment	Pretest	22	12.7727	2.68916	1.502	21	.148
	Post-test	22	11.6818	3.37196			
11.Sense of Belongingness	Pretest	22	6.4545	1.53459	-.249	21	.806
	Post-test	22	6.5909	2.06234			

Paired sample t-test was conducted to analyze the difference in the level of Global Citizenship Skills after going through an intervention of completing authentic assessment tasks during a whole semester. The result given in the above table highlighted that there was not any significant difference in the development of Global Citizenship Skills among the students a result of intervention. Furthermore, on the subscale of Tolerance (p=.316) Openness (p=.896) Responsibility (p=.523), Respect for Diversity (p=.726), Ethical Understanding (p= .055) Intercultural Understanding (p=.637), Democratic Participation (p=.702), Respect for Environment (p= .148), Conflict Resolution (p=.123) and Sense of Belongingness (p= .806) were found insignificant ($p<.05$). The only subscale about having awareness of Global Citizenship values (***p*=.037)** significantly positively improved score of learners in online learning management system after intervention.

Discussion

Information and Communication Technology (ICT) Skills and Adaption of 21st Century Skills in Blended Learning Environment

The findings of ICT literacy test, (which was conducted from the students selected for this study) revealed the fact that mostly students were found basic ICT literate and meanwhile it was also evident from their participation on discussion board of LMS and poor citation skills in completing online assignment tasks. It findings can be linked with their low motivation towards improving the ICT skills. The low performance in ICT literacy test and low motivation to learn the appropriate use of ICT skills added hindrance among the learners to obtain information and use it in ethical way through ICTs.

Hence, low prior competence in ICT skills decrease their motivation to use LMS that resulted in lack of proper citations, using irrelevant material to attempt authentic assessment tasks and very less use of discussion board was evident in performing of such

missing skills. Fryer and Bovee (2016) also found that prior competency in using ICTs was found a potential predictors of future motivation for learning online.
It can be concluded from the results that authentic assessment tasks helps the students to improve their critical and creative thinking skills. Learning management system provides the space to use 21st century tools to gather and interpret information and use it in more creative way. But Sometimes the lack of having appropriate ICT skills create hindrance to exhibit critical and creative abilities while working on learning management system or working online.

Learners having insufficient basic ICT skills required electronic medium consume excessive time in learning while interacting with technology hence get less time for learning. Due to which, instructional designers must consider the "learner-interface interactions "which enable them to have productive interactions with mediating technology.

Media Literacy and Effective Use of Online Information

Although, in this study we could not find a significant difference in the media and information literacy skills (MILS) of learner after the intervention but students were found at medium level of MILS. In this regard, the students inability to cite properly, less use of open educational resources (OERs) in completing authentic assessment tasks also provide an evidence about being less capable of handling and using online resources and information properly. The findings of the study lead to the conclusion that despite the fact that media and ICT has taken a sound footing in our society but even then our youth in elite universities are not very confident about their skills to use and analyze the information taking through ICTs in ethical way. This implicates that there is a need to prepare our students to improve their ability to search information, collect and process the information electronically, using data in systematic way. Moreover, there is also need to enhance their ability to apply a fundamental understanding of the legal issues related to use and access of information though ICTs.

Locus of Control and Learners' Motivation

Intrapersonal skills of learners require them to be independent, self-disciplined and self-motivated towards learning. Wedemeyer (1981) identified the essential aspects of individual learning as significant student responsibility, broadly available instruction, effective use of ICTs, adjustment to individual differences and methods. Holmberg (1989) established the basics of theory construction including the elements of independence, learning and teaching. Another, factor which is relevant in this context is learners' Control. Under this theoretical concept, he examined the locus of control (Rotter, 1989) concluded that learners perceiving their educational success as result of their own achievements have an "internal locus of control" and are more likely to endure in their academics. Learners with an "external locus of control" believe that their accomplishments or failure is due to the external events like luck or fate which are outside their control. Thus, students with external locus of control have more chances of dropouts. Factors of control that influence dropout rate have been of concern to distance

educators as they search for criteria to predict successful course completion. Baynton (1992) examined the concept of control as defined by independence, support and competence. She notes that control is more than independence. It demands a balance among three factors: a learner's independence (to make choices), support (both individual and material) and competence (ability and skill)and Baynton's factor analysis confirmed the worth of these factors and suggested that other factors may also affect the concept of control, which should be examined to describe complex interaction accurately between teacher and learner in distance learning setting.

The concept of interaction is fundamental to investigate in order to examine the effectiveness of distance as well as traditional education programs. Hillman, Hills and Gunawardena (1994) had also taken the concept of interaction as a step farther and included a fourth element to the model "learner-interface interaction". They noted that the interaction between the learner and technology that delivers the instruction is also a critical component of the model, which was missing thus far in the literature. Hence, in case of findings of our research the learners did not improve in their independent learning skills can be concluded due to their weak internal locus of control. However, the interaction between the learner and the technology that delivers instruction is also a critical component of the model, which has been missing thus far in the literature. Moreover, individuals' personal profile characteristics and their adaptations towards being more comfortable to use learning management system and the tasks assigned on it may help to get rigorous findings.

Conclusion and Recommendations

As the findings of the study revealed significant improvement of 21st century skills in post intervention measurement of skills specially related to critical and innovative thinking skills due to the nature of authentic assessment tasks provided to them during the intervention phase. On the other hand due to the fact that in non formal institutions we have mostly middle to old aged ranged students. As long as you get older the adoption skills of learners towards new skills(media and information literacy etc.) is reduced. Similarly, these old aged students are reluctant to use ICTs and hence technology could be one of the intervening factors in development of skills in blended learning environment. So, at this time prepare our learners for 21st century we need to add the activities in the curriculum at earlier grades that make sure for learners to acquire at least minimum level of basic 21st century skills i.e. ICT literacy, communication skills and critical thinking skills.

Following recommendations can be made based on the findings of the research.

1. Appropriate awareness and use of Information and Communication Technology (ICT) was found as pre-requisite skill that could not create hindrance for the learners to develop the intended skills under the experiment i.e. communication and learning in 21st century for the students in online and blended learning environment. Sufficient training and practice of using technology to access learning materials to complete the assigned tasks may be conducted before the

starting of course formally. This may be given as orientation training at their local study centers/ regional campuses.

2. Sufficient administrative support may be provided to students keeping in view their lack of active participation in online activities their timely submissions and responding the queries related to technical problems while using the learning management system.
3. Some online activities can be initiated and made compulsory to complete right after the confirmation of admission and before the commencement of formal classes/ workshops.
4. There should be some check points and use of online statistics to ensure the efficient and effective academic communication between learners and tutor to facilitate online learning and improve academic pitfalls.
5. The hindrances in completing the online tasks by students diminish their motivation level to complete tasks required critical thinking skills and other higher order learning skills.
6. The active communication between teacher and learners may reduce the feeling of socially isolated and academically helpless in blended and virtual learning programs. Pop-up messages by tutors and course coordinators can be sent frequently to engage the students in different activities specially non-credit activities as to boost up their motivation towards learning the new skills.

References

Ainley, J., Fraillon, J., Freeman, C., & Mendelovits, J. (2006, April). *Assessing information and communication technology literacy in schools.* Paper presented at the Annual Meeting of the American Educational Research Association, San Francisco, CA.

Bob, J. (2013). ***Internet Skills Checklist***. http://www.cotwcourses.net/ tec908/ standards/internet_skills_checklist.htm

Brian Mulligan. Email's practical. http://staffweb.itsligo.ie/ staff/ bmulligan/ Practicals/TheWeb/ITSligoEmail.htm

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3221376/table/table1/ Retrieved on (Jan8, 2018)

Clift, S. (2002). *21st literacy summit white paper*. www.mail-archive.com/dowire @tc.umn.edu/msg00434.html

Dziuban, C., Moskal, P., Kramer, L., & Thompson, J. (2013). Student satisfaction with online learning in the presence of ambivalence: Looking for the will-o'-the-wisp. *The Internet and Higher Education,* 17, 1–8. doi:10.1016/j.iheduc.2012.08.001

Evans, M. Ingram, L. MacDonald A. and Weber N. (2009). Mapping the 'global dimension' of citizenship education in Canada: The complex interplay of theory, practice, and context. *Citizenship, Teaching and Learning*,5(2), 16-34.

Fryer, L. K., & Bovee, H. N. (2016). Supporting students' motivation for e-learning: Teachers matter on and offline. *The Internet and Higher Education*, 30, 21-29.

Janesick, V. J. (2006). *Authentic assessment primer*. Peter Lang, International Academic Publishers.

Lavrakas, P. J. (2008). *Encyclopedia of survey research methods*. Thousand Oaks, CA: Sage Publications, Inc. doi: 10.4135/9781412963947

Technology Competencies: Internet Skills.http://statelibrary.ncdcr. libguides.com/ tech_competencies2016/internet

McFarlance, A. (2001). Perspectives on the relationships between ICT and assessment. *Journal of Computer Assisted Learning 17,* 227-234.

UNESCO (2016). *A Global measure of digital ad ICT literacy skills .Global Education Monitoring Report.* Retrieved on (Jan 8, 2018). unesdoc.unesco.org/images/0024/ 002455/245577E.pdf

International ICT Literacy Panel. (January, 2001). *Digital transformation: A framework for ICT literacy.* Princeton, NJ: Educational Testing Service. Retrieved on (Jan 8, 2018)https://www.ets.org/Media/Tests/Information_and_Communication_Technology_Literacy/ictreport.pdf

UNESCO (2015).Media and Information literacy Curriculum for teachers. http://unesdoc.unesco.org/images/0019/001929/192971e.pdf

UNESCO (2018). Unifying notions of media and information literacy. Retrieved on (Jan8, 2018) http://unesco.mil-for-teachers.unaoc.org/foreword/unifying-notions-of-media-and-information-literacy/

UNESCO. 2013. *Global Media and Information Literacy Assessment Framework: Country Readiness and Competencies.* Paris, UNESCO. Retrieved fromhttp://www.unescobkk. org/fileadmin/user_ upload/ict/Workshops/ RDTC_15ch/S6D3-Ramon.pdf

UNESCO Bangkok. (2003). *Meta-survey on the use of technologies in education in Asia and the pacific.* UNESCO Asia and Pacific Regional Bureau for Education, Bangkok.

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