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Dear Colleagues,

We are proud to say that TOJDEL publishes July, 2020 issue. This issue has international different papers from various fields are shared with professionals. It is a free online journal and offeres free Access to all articles. When the journals are free to access all published articles, it increases the level of impact factor.

TOJDEL is a multidisciplinary peer-reviewed journal in the field of distance education. TOJDEL welcomes the submission of manuscripts that meets the general criteria. TOJDEL is dedicated to increasing the depth of the subject across disciplines with the ultimate aim of expanding knowledge of distance education. TOJDEL is seeking for qualified and high profile researchers to join its editorial team as editors or reviewers.

TOJDEL thanks and appreciate editors who have acted as reviewers for one or more submissions of this issue for their valuable contributions. As always, issue v.8 i.3 – 2020 features contributions from many countries. Any views expressed in these publications are the views of the authors and are not the views of the Editor and TOJDEL.

TOJDEL will organize IDEC-2020 (www.id-ec.net) at Cyprus International University. IDEC series is an international educational activity for academics, teachers and educators. This conference is now a well known distance education event. It promotes the development and dissemination of theoretical knowledge, conceptual research, and professional knowledge through conference activities. Its focus is to create and disseminate knowledge about the use of distance education.

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July 01, 2020
Editor,
Prof. Dr. Aytekin İŞMAN
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A STUDY ON PERCEPTION OF PERCEIVED EASE OF USE TOWARDS PERCEIVED USEFULNESS ON SMART EDUCATION

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ABSTRACT
Internet of Things (IoT) has changed things over the decades. The education method has shown small improvement only in some areas. SMART education has been introduced. Some of the concepts of SMART education has been implemented in other forms. Thailand has introduced Thailand 4.0 policy, which includes the SMART city as a new engine growth of a nation. SMART education is a part of the SMART city. This paper is aiming to understand the perception of perceived ease of use towards perceived usefulness on SMART education. The Technology Adoption Model (TAM) has been used to measure the concept focusing on perceived ease of use and perceived usefulness. There are 424 respondents using convenience sampling and snowball methods. The research uses statistical software with the Pearson correlation, single linear regression, and multiple linear regressions to measure the result. All SMART components are perceived as useful except Resource Enriched. The strongest perceived usefulness is Technology Embedded (TE). The second and third strongest perceived usefulness is Adaptive (AE) and Motivate (ME). The least perceived usefulness is Self-directed (SE). The study can benefit the institute to focus on any part of SMART education components based on their focus by their priority in terms of implementation, development, and budget allocation for investment.
Keywords SMART education, SMART University, TAM, Education, Self-directed, Motivation

INTRODUCTION

The Internet of Things (IoT) has been playing an important role in our daily life. It is considered as an opportunity and threat in almost every industry. Over the decades, the time passed, and things changed while an education system has remained the same or change only a few components. The changing of technology permits many opportunities as a tool to integrate new concepts, technology, and methodology in the education system (Riezebos,2016). However, an actual education development over the decades has been still unclear and applied slowly to the concept, technology, and methodology.

Thailand faces a decline in student numbers on a graduate degree and above due to the generation's behavioral change. Moreover, Thailand has announced government policy to be Thailand 4.0 to drive the nation's economy as a new engine growth. SMART city is one of the priorities for Thailand's innovation plan, which including SMART education. Aligning with the Thai government's policy and global technology change, an acceptance of SMART education components should be studied from the perception of the student for future development by the institute. Education methods should be developed to align with technology and present world trends (Curry, 2011).

This paper aims to study perception in terms of acceptance of the SMART education method using the Technology Acceptance Model (TAM Model), which focuses on perceived ease of use toward perceived usefulness. Current education methodology is already applied to some SMART education concept. The result of this study will enable the institute to find the improvement area in their school for further development, investment, or improvement priority from SMART education components.

LITERATURE REVIEW

This research study on conceptual of SMART education components but not focus in term of new-technology or technical terms which will enable this paper not to be limited only technology at the time conducting research. The Technology Acceptance Model (TAM) also studied in this paper to understand the concept of future actual

system use. The model can explain the perception of perceived ease of use and the perceived usefulness of SMART education (Koper, 2014).

SMART Education

The SMART education theory in this paper reference from The Ministry of Education, Science and Technology of the Republic of Korea (2011) which categorized SMART education concept into five main categories containing:

1. Self-directed: an expansion of education time
2. Motivated: an expansion of education methods
3. Adaptive: an expansion of education capacity
4. Resource enriched: an expansion of education content
5. Technology embedded: an expansion of education space
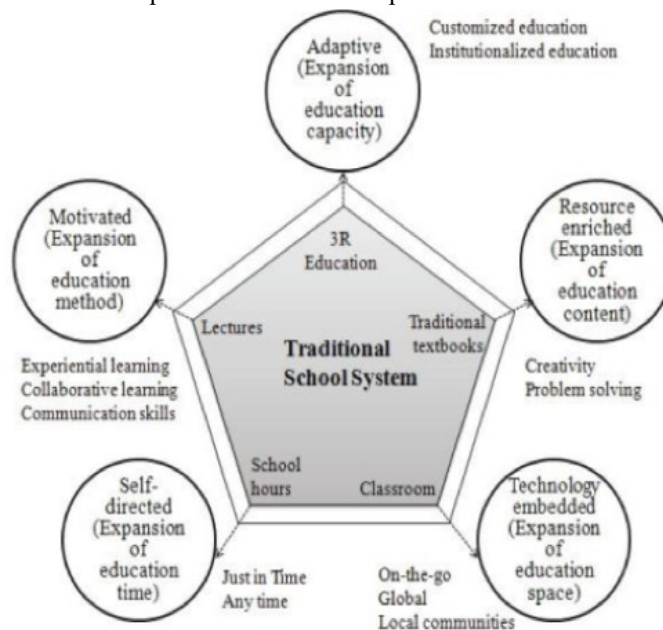
Figure 1. Basic characteristics of intelligent learning. Source: Ministry of Education, Science and Technology of the Republic of Korea (MEST) (2011), extracted from Sung, M (2015). A study of adults' perception and needs for smart learning. *Procedia-Social and Behavioral Sciences*, 191, 115-120.

Figure 1 has illustrated the new shift of the traditional education system into the SMART education system as a modern platform. However, the modern concept is not fixed to any new technology which can be developed and implement new technology or method into SMART education (Choi,2013).

Technology Acceptance Model

The research studied using the Technology Acceptance Model (TAM) (Davis, 1989). Perceived usefulness (PU) and the perceived ease of use (PEOU) are mentioned by the TAM framework, which creates behavioral intention to use for further system use.
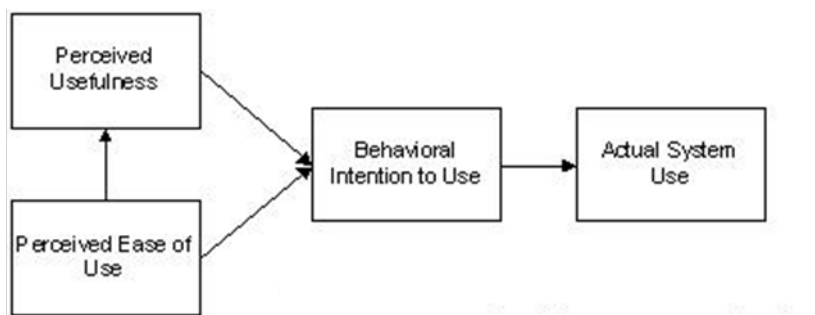
Source: Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319-339.

Figure 2. Technology Acceptance Model

RESEARCH FRAMEWORK

The framework in this research is adopted framework from the published research paper Analysis of the Scientific Literature Published on Smart Learning (Sánchez, García, Río-Rama, Lalangui, 2018), combining with Technology Acceptance Model (TAM) (Davis, 1989). In this study, the perceived SMART education was measured with the Technology Acceptance Model, perceived ease of use, and perceived usefulness(Alharbi, Drew, Saleh, Drew, 2014). Then, the perceived ease of use on SMART education will be to measure the perceived usefulness. Hypothesizes are proposed as below:

H1 The perceived ease of use (PEOU) in SMART education is effect to perceived usefulness (PU)
H1a The perceived ease of use (PEOU) in Self-directed is effect to perceived usefulness (PU)
H1b The perceived ease of use (PEOU) in motivation is effect to perceived usefulness (PU)
H1c The perceived ease of use (PEOU) in Adaptive is effect to perceived usefulness (PU)
H1d The perceived ease of use (PEOU) in Resource Enriched is effect to perceived usefulness (PU)
H1e The perceived ease of use (PEOU) in Technology Embedded is effect to perceived usefulness (PU)
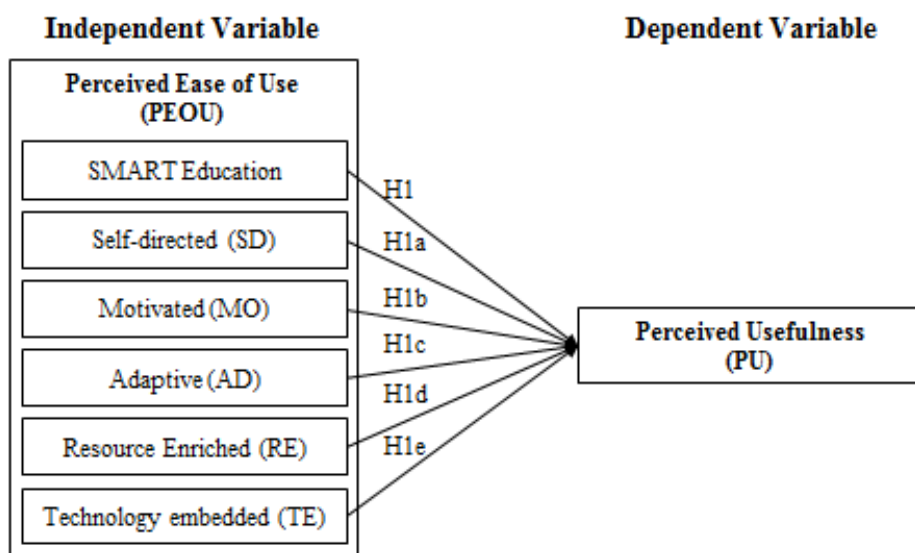
Figure 3. Research Conceptual Framework

RESEARCH METHODOLOGY

This research questionnaire was distributed via an online channel to collect quantitative data with a non-probability sampling method by convenience sampling and snowball technique. The questionnaire designed use the Five-Point Likert scale, ranging from 1 (Strongly Disagree) to 5 (Strongly Agree) to measure the hypotheses.

There are 42 questions (exclude demographic) to measure the respondent's perception. The proposed framework's questions are as follows:

- Self-directed (Expansion of time)
- Motivated (Expansion of education methods)
- Adaptive (Expansion of education capacity)
- Resource Enriched (Expansion of educational content)
- Technology embedded (Expansion of space)
- Perceived Usefulness

Measurement of variables

The target respondents are Thai people who used to or studying in higher education, either public or private universities.

Population and Sample

The number of respondents in this study was reached 424 respondents to represent the Thais population. Convenience sampling and snowball methods were used in this study.

Reliability test

The 30 sets of pilot questionnaires were distributed to target respondents. This research used Cronbach's Alpha Coefficient to test the reliability of pilot questionnaires. All results after test with independent variable meet the Cronbach's Alpha Coefficient greater than 0.6 (Cronbach, 1961) as below:

Table 1*: Reliability Test of Pilot Questionnaires (N=30)*

Variable	Cronbach's Alpha	Number of Items
Self-directed (SD)	0.759	5
Motivated (MO)	0.74	5
Adaptive (AD)	0.762	3
Resource Enriched (RE)	0.704	4
Technology embedded (TE)	0.813	4
Perceived Usefulness (PU)	0.896	21
Overall Reliability	0.844	42

RESULTS AND DISCUSSION

This research use Pearson correlation, multiple linear regression by statistical software to find the statistic result and relationship of dependent and independent variable.

Data analysis

Table 2*: Demographic information of respondents*

Demographic Information (N=424)		Frequency	Percentage (%)
Gender (N-424)	Female	250	61%
	Male	162	39%
Age (N-424)	22-37	375	91%
	38-53	34	8%
	54-72	3	1%

Status	Married	37	9%
(N-424)	Single	375	91%
Education	Bachelor's Degree	224	54%
(N-424)	Doctoral Degree	5	1%
	Master's Degree	183	44%
Previous Education	Private Study	82	20%
(N-424)	Public Study	330	80%
Occupation	Business owner	25	6%
(N-424)	Employee	321	78%
	Freelance	29	7%
	I am a student	34	8%
	Unemployed	3	1%
Income	<15,000	5	1%
(THB per month)	15,001-30,001	161	39%
(N-424)	30,001-45,000	128	31%
	>45,001	118	29%

There are 424 respondents completed the questionnaire. There are female 61 %, and male 39 %. The majority of respondent's age is between 22 – 37 years old at 91%.The respondents' age from 38 – 53 are at 8%. Consequently, there are three people who are between 54 – 72 at 1%. The majority of respondents are single at 91 %, followed by 9 % for married. There are 54 % of respondents who studied Bachelor's Degree, 44 % studied Master's Degree, and 1% studied Doctoral Degree. Most of the respondents presently studied in Public Study at 80 %. There is only 20 % studied Private School. Majority of them are work as an employee at 78%. Other respondents are studying, freelance, and business owners with 8%, 7%, and 6%, respectively. Most of them have an income level between 15,000 to 30,001 THB per month at 39%. Follow by 30,001 to 45,000 THB per month at 31%, more than 45,001 THB per month at 29%, and less than 15,000 THB at 1%.

Pearson's Correlation Matrix

Table 3:*Result Descriptive analysis and correlation matrix (N-424)*

	Mean	Std Deviation	SE	ME	AE	RE	TE	SMART	PU
SE	3.6042	0.67784	1						
ME	3.4670	0.74329	.366**	1					
AE	3.4615	0.79669	.332**	.536**	1				
RE	3.7034	0.61889	.174**	.366**	.389**	1			
TE	4.0548	0.60590	.342**	.354**	.244**	.367**	1		
SMART	3.9146	0.49524	.463**	.561**	.560**	.336**	.530**	1	
PU	3.6582	0.47898	.639**	.776**	.755**	.643**	.636**	.712**	1

**. Correlation is significant at the 0.01 level (2-tailed).

Table 3 shows the Pearson correlation from 0.174 to 0.776. P-values of all variables are tested at less than 0.01 significant levels. The highest positive value is between perceived ease of use in motivated (ME) and perceived usefulness (PU). The second highest positive value is from perceived ease of use in adaptive (AE) and perceived usefulness (PU) at 0.755. The perceived ease of use (PEOU) and perceived usefulness (PU) has the third-highest positive at 0.712. The weakest positive relationship is at perceived ease of use on resource enriched (RE) and self-directed (SE) at 0.174. The second most weak positive value is between perceived ease of use on adaptive (AE) and technology embedded (TE) at 0.244. The third weak positive relationship is the perceived ease of use on self-directed (SE) and adaptive (AE) at 0.332.

Based on the SMART education concept with Pearson correlation, all sub-variable, self-directed (SE), motivated (ME), adaptive (AE), resource enriched (RE), technology embedded (TE) are highly related to perceived usefulness. The r value is greater than 0.50.

The results tell that factor that easy to use for perceived ease of use (PEOU) with highly significant is ME (0.561), AE(0.560), TE (0.530), while SE (0.463), RE (0.336) are moderate significant.
From the mentioned result, the least significant with perceived usefulness are self-directed (0.639), resource enriched (0.643), and technology embedded (0.636). This mean motivated (0.776) and adaptive (0.755) are perceived as more useful than SE, AE, and RE.

Overall, perceived ease of use (PEOU) in SMART education is strongly significant with perceived usefulness (PU) at 0.712.

Simple Linear Regression

Table 4: Simple Linear Regression for H1

Variable	B	Sig.	VIF
(Constant)	1.220	0.000	
SMART	0.737	0.000	1.000
R Square	0.507		
Adjusted R Square	0.506		

a. Dependent Variable: PU

Table 4 is explaining that perceived ease of use on SMART education is significant at 50.7% from R Square at the significant level of 0.05. The standard coefficient is 0.737. The result of VIF is 1. So, the result shows that perceived ease of use on SMART education is a positive effect on perceived usefulness (PU), which supports H1.

Multiple Linear Regressions

Table 5: Result of Multiple Linear Regressions (MLR) for H1.

Variable	Standardized Coefficients beta (β)	Variance Inflation Factor (VIF)	Sig.
SE	0.171	1.266	0.000
ME	0.223	1.593	0.000
AE	0.311	1.538	0.000
RE	-0.014	1.326	0.711
TE	0.322	1.314	0.000
R Square	0.544		
Adjusted R Square	0.538		

a. Dependent Variable: PU

An above table was run to predict perceived usefulness (PU) from self-directed(SE), motivated (ME), adaptive (AE), resource enriched (RE), and technology embedded (TE). These variables statistically significantly predicted perceived usefulness (PU), $F(5, 418) = 99.698$, $p < .0005$, $R2 = .577$. Four of the variables included self-directed(SE), motivated (ME), adaptive (AE), and technology embedded (TE) are statistically significant to the prediction, $p < .05$. However, resource enriched (RE) is rejected because of the significant level at 0.711.

CONCLUSIONS AND RECOMMENDATIONS

This research is aiming to find how the relationship between perceived ease of use of SMART education, self-direct, motivation, adaptive, resource enriched, and technology embedded affect the perceived usefulness. This

research is used 424 respondents' online questionnaire by using convenience and snowball method for data collection.

Table 6: Result of Hypothesizes

	Hypothesizes	Result
H1	The perceived ease of use (PEOU) in SMART education is effect to perceived usefulness (PU)	Supported
H1a	The perceived ease of use (PEOU) in Self-directed is effect to perceived usefulness (PU)	Supported
H1b	The perceived ease of use (PEOU) in motivation is effect to perceived usefulness (PU)	Supported
H1c	The perceived ease of use (PEOU) in Adaptive is effect to perceived usefulness (PU)	Supported
H1d	The perceived ease of use (PEOU) in Resource Enriched is effect to perceived usefulness (PU)	Not Supported
H1e	The perceived ease of use (PEOU) in Technology Embedded is effect to perceived usefulness (PU)	Supported

The above table show that all hypothesizes are accepted except H1d; the perceived ease of use (PEOU) in Resource Enriched is an effect on perceived usefulness (PU).

Self-directed (SE), Motivated (ME), Adaptive (AE), Technology Embedded (TE) are perceived as useful (PU). The strongest perceived usefulness is Technology Embedded (TE). The second and third strongest perceived usefulness is Adaptive (AE) and Motivate (ME). The least perceived usefulness is Self-directed (SE). Resource Enriched (RE) is not a supported hypothesis.

The job of the institute is required to balance the perceived ease of use with the perceived usefulness. The institute shouldfocus on the most useful item, Technology Embedded (TE) and Adaptive (AE). For Motivated (ME), the institute should develop a methodology to be more useful. Also, the institute should make it less useful to be more useful and easy to use, Self-Directed (SE). Resource Enriched (RE) that not supported by hypothesis should be focus most. All mentioned will help to create an attitude towards using SMART education and create behavioral intention to use for actual use consequently.

The study will help enhance the value of institute, and to align with the present global trend on IoT. The benefits which enable institute from this research are as below;
1) Priority to the first implement
2) Priority to develop
3) Priority to allocate the budget for further investment

The three mentioned items are dependent on which part the institute concern with. The future is coming with technology around us. To be a real Integration with technology is another key important to apply to SMART education for better efficiency, better effect in future education for the world, which needs a priority by visionary institute onward.

LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH
The study includes only perceived ease of use and perceived usefulness on the Technology Adoption Model (TAM), which excludes behavioral intention to use and actual system use (Davis, 1993). The SMART education model is a study on conceptual without specific present technology use today, such as artificial intelligence (AI), blockchain, machine learning, wireless communication, video conference, virtual reality, etc. The future research

can study on whole TAM model and specific present technology use to know the perception of the technology platform (Ajzen and Fishbein, 1975).

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# ASSESSING KNOWLEDGE OF HEALTH EDUCATION COMPETENCIES VIA DISTANCE LEARNING ENVIRONMENT: A PILOT AND A NOVEL APPROACH AMONG UNDERGRADUATE STUDENTS AT A SOUTHERN UNIVERSITY IN THE UNITED STATES

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ABSTRACT
The mission of the National commission for Health Education Credentialing (NCHEC) is to enhance the professional practice of health education professionals by promoting and sustaining a credentialed body of health education specialists. They set various areas of responsibilities for health education specialists to describe the profession more comprehensively and add clarity to their roles within and outside the profession. The purpose of this novel pilot study was to assess mastery of certain health education related competencies based on specific specific Areas of Responsibilities' (Area I, Area II, Area III and Area IV) using a distance learning (100%) health program planning and evaluation online course. Results from data collected over two semesters demonstrated that there was a gain in knowledge in the Areas of Responsibilities' mentioned above. There is an emerging need for additional studies which assess gain in content knowledge among entry-level health education specialists particularly using rigorous experimental designs. Health education and promotion curriculums across the nation need to strengthen health education competencies among health education specialists for providing improved health education practices.
Key words: competencies, health education specialists, curriculum, distance learning

Introduction and purpose

The mission of the National Commission for Health Education Credentialing (NCHEC) is to enhance the professional practice of health education professionals by promoting and sustaining a credentialed body of health education specialists (National Commission for Health Education Credentialing, 2020). The seven areas of responsibilities set forth by the NCHEC assesses competencies and sub competencies defining the role of health education specialists. These competencies were verified by 2010 Health Educator Job Analysis report was the basis of conducting Certified Health Education Specialist (CHES) in past and were used for this study. However, this was recently updated and revised to have eight areas of responsibilities' which were developed building on the Health Education Job Analyses 2010 and Health Education specialists practice analyses 2015 models. (NCHEC, 2017, 2020).

The role of health education specialists as practitioners, researchers and leaders in health care organizations, communities, schools and universities has clearly evolved over last decade. The recent Health Education Practice Analysis II 2020 (National Commission for Health Education Credentialing & Society for Public Health Education, 2020) model has revised and updated the competencies and sub competencies that are essential for contemporary health education practice, along with the areas of responsibilities. The National Commission for Health Education Credentialing has revised their Certified Health Education Specialist and Master Certified Health Education Specialist Exams accordingly while also acknowledging the change in terminology of Health Education to Health Education/Health Promotion for various Areas of responsibilities for health education specialists to describe the profession more comprehensively and add clarity to their roles within and outside the profession (NCHEC, 2020; Society for Public Health Education 2020).

It certainly behooves then, that instructors offering health education/promotion programs, across the nation, train emerging health education specialists with content and skills which match the entry level competencies and sub competencies of a bachelor trained health education specialist and advanced level competencies and sub competencies of a master trained health education specialist. Along with the general robust growth in online courses and programs offered, there has been a specific growth in fully online programs in the areas of public health and health education. Recent efforts to demonstrate the importance of online training for public health

workers (Stamaikos, & Ratnapadipa, 2011) along with academic courses and programs in public health provide credence to this movement (Krisberg, 2012).

The purpose of this pilot study was to assess mastery in knowledge of health education competencies based on specific Areas of Responsibilities' (Area I, Area II, Area III and Area IV) using a distance learning (100%) health program planning and evaluation online course over a span of two semesters among a sample of undergraduate college students at a Southern University in the United States. The above-mentioned Areas of Responsibilities' were particular identified for this study as the researcher believed that they align the most with the course content.

Methods

An Institutional Review Board approval was sought and the study was approved in the Summer of 2013. This was a cross-sectional study which involved a short survey (10 questions) adapted from the National Commission for Health Education Credentialing (NCHEC, 2017) website. An announcement was posted in the online course shell of the HHPS 4380 Health Education Program Evaluation Course recruiting students to participate in this study during the Fall 2013 and Spring 2014 semesters and multiple reminders were sent over a period of two semesters. The survey was deployed in an online environment – as a course link under the 'Assessment' section of the online course. Students were provided extra-credit points for completing this assessment survey. These extra-credit points were no more than 3% of the total course grade. A Pretest-Posttest single group design methodology was used for this study among a self-selected sample of upper level undergraduate students (n=70) in a health program planning and evaluation course where the online course was an intervention itself.

Results

As per Table 1, the study reported results as percent of correct responses on the knowledge questions among upper level undergraduate students (n=31) along with percent change in knowledge scores for the Fall 2013 semester

---------------Please see Table 1----------------------------------

As per Table 2, similarly results from Spring 2014 semester are displayed

----------------Please see Table 2------------------------------

Discussion

The purpose of this pilot study was to assess the mastery in knowledge of various health education related competencies based on diverse areas of responsibilities developed by the National Commission for Health Education Credentialing (NCHEC, 2017). The researcher believes that such a novel attempt to assess the health education competencies via Areas of responsibilities was the first of its kind in a 100% distance learning format. Overall, the literature in designing distance learning health education programs is limited (Ball et al, 2013; Chaney, Chaney, Stellefson & Eddy, 2008; Escoffery et al., 2005) and doesn't address measurement of National Health Education Credentialing Competencies (NCHEC) (NCHEC, 2017,2020).

The knowledge gain of students in Areas of Responsibilities 1, II, III, & IV cannot be fully attributed to this course (as an intervention), as students enrolled in this course were upper level undergraduate students who could have been simultaneously enrolled in other health education courses which offered knowledge and skills related to gaining competency related to the Areas of Responsibility mentioned above to train budding health education specialists.

An interesting and an inexplicable finding was that students actually showed a 4.9% loss in knowledge related to Area II: program planning responsibility from pre-test-post-test. It could be possible that sample questions addressing this area were fewer and not quite validated. It would be good to have a validated questionnaire with multiple constructs addressing the 'program planning' area to either show some gain in this competency or no gain (particularly if the pretest knowledge was already higher in this Area of responsibility).

Limitations

There were number of limitations of this study such as a) limited number of questions to judge the competency development among emerging health education professionals, b) a self-selected sample of undergraduate students and unaddressed Areas of Responsibilities such as Area V, VI, and VII and finally c) a non-experimental design (Cottrell, & Mckenzie, 2011). Further studies could build upon this study with an extensive competency-based assessment via not only a single course study but multiple courses and programmatic studies. It is recommended that researchers obtain a random sample of students to participate in a

distance learning environment to improve the external validity of the study and strengthen the design to an experimental randomized comparison design which is considered the 'gold standard' for internal validity (Chang, Hayter, Yeh, Hsieh, & Kuo, 2016; Xi, Mao, Chen & Bai, 2017). Although competency building was discussed in this article, competencies and sub competencies were not specifically tested and measured as the researcher believed that such an attempt would be too complex in an 100% online learning environment and Areas of responsibilities were used as a 'proxy' for competency building. Another limitation of this study was of fully online testing of students which did not allow proctoring and hence the identity of students completing both the pretest and the post-test surveys could not be validated.

Conclusions

As emerging health education specialists prepare themselves to enter the health education/promotion workforce, the knowledge and practicing skills related to the previous seven areas of responsibilities identified by the National Commission for Health Education Credentialing become very vital, particularly those related to health program planning and evaluation. Since more than two-thirds of the percentage questions on the Certified Health Education Specialist Examination (NCHEC, 2017) correspond within areas of needs assessment, health education/promotion program planning, implementing and evaluating, the health program planning and evaluation course covers most of the competencies for practicing health education specialists. The revised and updated competency-based framework has added the eight Area of responsibility of 'ethics and professionalism' (NCHEC, 2020; Society for Public Health Education, 2020).

Health Education profession has undergone periodic analyses of its competencies and sub competencies at the entry level health education specialists and advanced-level health education specialists over last 10 years (NCHEC,2020; SOPHE, 2020). Although, this study findings provided a snapshot of knowledge outcomes, it opened doors for what could be achieved by health education faculty in terms of assessments conducted at curricular level. Program planning and evaluation related competencies are hallmarks for the health education workforce and very well represented on the percentage of questions in the Certified Health Education Specialist Exam (NCHEC, 2020). It is hence imperative that undergraduate programs nationwide which teach planning, implementing and evaluation courses assess knowledge and skills in these content areas to create a competent cadre of health education/promotion professionals.

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Table 1.

Fall Semester 2013-Areas of responsibilities-knowledge assessed among undergraduate students-correct responses (n=31)

Areas of Responsibilities*	Pretest	Posttest	% age of change
Area 1 Assess needs, assets and capacity for health education/promotion	79.8%	80.7%	Gain 0.9%
Area 11 Planning health education/promotion	94.6%	89.7%	Loss 4.9%
Area III Implementing health education/promotion	75.8%	82.6%	Gain 6.8 %
Area IV Conduct evaluation and research related to health education/promotion	48.3 %	50 %	Gain 1.7%

*updated and revised in 2015

Table 1I.

Spring Semester 2014-Areas of responsibilities-knowledge assessed among undergraduate students-correct responses (n=33)

Areas of Responsibilities*	Pretest	Posttest	% age of change
Area 1 Assess needs, assets and capacity for health education/promotion	57.5%	72.4%	Gain 14.9%
Area 11 Planning health education/promotion	79.7%	86.2%	Gain 6.5%
Area III Implementing health education/promotion	54.5%	68.9%	Gain 14.4%
Area IV Conduct evaluation and research related to health education/promotion	42.4%	55.1%	Gain 12.7%

*Updated and revised in 2015

CHALLENGES OF USING ICT FOR INCLUSIVE EDUCATION IN NORTH EAST INDIA

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ABSTRACT
Inclusive education refers inclusion of all the students irrespective of their sex, race, colour, poverty, disability and they have given equal opportunity in education and to be considered as being an integral part of the learning community. Education is the fundamental right of a child and it is very important for the individual development as well as the national development. We are the generation of 21st century which is known as the era of technology. Now a days education is linked with the information and communication technology (ICT). But India is still a developing country and the computer literacy rate of India is 6.5%. Therefore, it is very challenging to provide education through ICT in an inclusive set up. In North East India, lack of technology, internet access, and qualified trainers etc. are as the biggest challenges in providing ICT-based educational services to the masses, especially to the marginalized group of people. Most important thing is that most of the time it is very difficult to provide education for the students with special need with the help of ICT in a common classroom along with the normal children. In this context, this paper will try to focus the challenges to provide education through ICT in an inclusive classroom. For this study, the researcher has used to collect data from 80 samples and sample is collected with the help of simple random sampling and the result of the paper shows that there are lots of barriers of using ICT for inclusive classroom in North East India.
Keywords: Disability, ICT, Inclusive education, Learning Community

Introduction

Inclusive education refers inclusion of all the students irrespective of their sex, race, colour, poverty, disability and they have given equal opportunity in education and to be considered as being an integral part of the learning community. Education is the fundamental right of a child and it is very important for the individual development as well as the national development. For the development of a region, education is the most important part of the society. Without the education one state or a community can't develop. Whereas nowadays education focuses on the inclusion of all classes and all the groups of the society. We have to focus the marginalized group of the people than only we are able to go towards the develop nation. When we are talking about the inclusive education we mainly focused on the economically weaker section of the society, person with special needs, SC, ST, OBC and women.

There are 8 states in the North East India. The states of North Eastern Region are officially recognized under the North Eastern Council (NEC) constituted in 1971 as the acting agency for the development of the North Eastern states. Long after induction of NEC, Sikkim formed part of the North Eastern Region as the eighth state in 2002. Most of the area in the North East India is tribal area and it is also a hilly area and geographically isolated from the main land of the India. North Eastern region of India is very famous for their cultural and historical background. In North East India lack of technology, internet access, and qualified trainers etc. as the biggest challenges in providing ICT-based educational services to the masses, especially to the marginalized group of the people. Most important thing is that most of the time it is very difficult to provide education for the students with special need with the help of ICT in a common classroom along with the normal children. Therefore it is very difficult to provide education through ICT in an inclusive classroom in North East India.

Concept of Inclusive Education

Inclusive education means that all students attend and are welcomed by the schools in age-appropriate, regular classes and are supported to learn, contribute and participate in all aspects of the life of the schools irrespective of their sex, colour, poverty, disability etc. It is new approach of teaching in where all the students are welcome to the mainstream society. In an inclusive classroom, children with special need students are given chance to pursue their education along with the normal children. In India NCERT joined hands with UNICEF and launched project for Integrated Education for disabled child in the year 1987 to integrated the disabled learner in the normal classroom. NCF 2005 is also given importance on inclusive education to experience dignity and provide confidence to learn. According to UNESCO: 'a dynamic approach of responding positively to pupil diversity and of seeing individual differences not as problems, but as opportunities for enriching learning.' The term 'children with special needs' is refers the children whose needs fall outside the established 'normal' range. The needs may be global or in a particular area or domain, that is, physical, behavioural, cognitive, social/ emotional etc. Plan of Action, 1992 said, "Child with a disability who can be educated in the general school should not be in the special school". It means it given emphasis of inclusion of special school with the normal

school. The Rehabilitation Council of India Act and the People with Disabilities Act,1992 also said that Children with disabilities have the right to access education in a "free and appropriate environment" until they are 18 years of age, promoting integration into normal schools. In the most recent days The RTE Act, 2009 tries to safeguard the rights of the children belonging to the disadvantaged groups and the weaker sections, protect them from any kind of discrimination and ensure their completion of elementary education. It is clear that the every educational policy, different act, different educational committee focus on the disadvantaged group and the children with special needs and it becomes the primary objectives of every educational policy.

Inclusive education occupies an important role in the whole education system. Because without the one group of the society we can't progress. In order to take all the students to the mainstream society we have to think inclusion of all the children in one classroom. Because most of the time the disadvantaged group of the society isolated and they also hesitate to mix up with the normal child. In that case when all the students are learning together that time they develop the friendship, social skills, comfort level etc. Therefore, inclusive education is one of the most important needs for the present society.

Meaning of ICT

Now a days Information and Communication Technology (ICT) is broadly used in the teaching learning process. Due to the scientific advancement technology is used in everywhere, in the field of education it is used in a larger way. ICT is one of the part of technology and Information and communication technology is an extensional term of communication technology that stresses the role of unified communications and the integration of telecommunications (telephone lines and wireless signals) and computers, as well as necessary enterprise software, middleware, storage, and audiovisual systems, that enable users to access, store, transmit, and manipulate information. ICT means gathering of information with the help of technology. Without the use of technology we can't even think our education system. Because now a days google classroom, e-learning etc. are the very common term which is used in the educational field.

Relation between Education and ICT

Inclusive education plays an important role to provide education to the disadvantaged group of the society. Now a days ICT is largely used in education. With the help of ICT we are able to improve the teaching effectiveness. ICT also helps in providing material, delivering content and assessment and evaluation in education. In an inclusive classroom it is very effective to provide education with the help of ICT. Because ICT makes teaching learning process more realistic one. With the help of using audio-visual aids in teaching, it makes learning permanent. As example in a classroom there is a slow learner or learning disable students, it is also helpful for them. Introducing ICT in schools, students found learning in a technology enhanced environment more stimulating and engaging than in a traditional classroom environment. Now a days ICT in education is globally accepted and appreciated. Without the use of Information and communication technology, it is very difficult to provide education. Therefore, it is very important to link education with ICT.

Significance of the Study

Education is the backbone of a country to preserve our culture and transmit it to the upcoming generation. The socio-economic, political, cultural etc. all the development of a country is possible only through the quality education. To provide the quality education link education with ICT is very important. Because it is the demand of the present education system. Like Any other developing country, India also have many problems in their education system, especially in the North Eastern region of India has lots of problems in the education system. To overcome those problems, it is very important to have some innovations in the education system, who are most reliable and effective for the education system. Education system requires psychological, philosophical, technological advancement. For the development of a country it is very important to educate all the people, therefore now a days the concept of inclusive education is very much popular. But it is very difficult to provide education through ICT for all the students in a common classroom. Therefore, it is very important to conduct such study related to the challenges of using ICT for inclusive education in North East India. But there are a very few few study has done related to this topic in North East India. Therefore, this study is carried out by the researcher to improve the quality education through ICT including all the students in a common classroom.

Review of Related Literature

Chanana (2014) conducted a study on Inclusive Secondary Education in India: Challenges and Future Directions and focus of this article is on secondary education in India as the transition phase from school to higher education, as an instrument of promoting education as a right and as the pathway to higher education and through that to social mobility and equality. The dimensions selected for detailed analysis are: participation of

the SCs and STs, the gap between the education of boys and girls and the regional variations with a focus on the northeast. The result of the study shows that there are several areas for research which have been earmarked. These are: composite schools from I- XII classes, integration of skill based education with general education, the expanding private sector in education, and the comparison of outcomes for students with similar scores from government and private schools etc.

Singh (2015) conducted a study on Problems and prospects of inclusive education in India. In this paper tries to focus into the issues of exploring possibilities and challenges ahead in realizing 100% inclusive education in India. The result of the study shows that though many initiative has been introduced at all levels to implement inclusive education in India but the road ahead is still quite long.

Kaushik & Sankar (2017) conducted a study titled as The Challenges and Opportunities to Implement Inclusive Education in West Bengal. The present paper try to focus the present paper for individual initiative on part of schools to implement programmes of inclusive education for children with mild to moderate disabilities in their elementary school classrooms. The paper provides guidelines in a generalized mode that schools can follow to initiate such programmes. The guidelines were derived from an empirical study which entailed examining prevalent practices and introducing inclusion in a regular school setting. It is suggested that schools can implement inclusive education programmes if they are adequately prepared, are able to garner support of all stakeholders involved in the process and have basic resources to run the programmes. The guidelines also suggest ways in which curriculum adaptations, teaching methodology and evaluation procedures can be adapted to suit needs of children with special needs.

Method Used for the Study
As the present study aims to study the challenges of using ICT for inclusive education in North East India. So the researcher was used descriptive survey research method. It was used for investigation and collection of the data to study the relationship between ICT and the inclusive education in North East India.

Sample and Sampling Technique

In the present study a sample of 80 students from the higher educational institute with the help of simple random sampling technique is used for the selection of sample.

Tools Used

In the present study a self-made questionnaire has used for collecting data along with the interview method and secondary sources like books, magazine, journal, official documents etc. were used to gather the necessary information.

Analysis and Interpretation of Data

1. Now a days education is linked with the information and communication technology (ICT).

Table No. 1.1

Statement	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
Now a days education is linked with the information and communication technology (ICT).	45%	34%	6%	15%	0

Table No. 1.1 shows the responses of the statement 'Now a days education is linked with the information and communication technology (ICT)'. It has been seen that the students responses are 45%, 34%, 6%. 15% and 0% accordingly it means strongly agree, agree, undecided, strongly disagree and disagree for the above mentioned statement. So it can be concluded that maximum students are strongly agree with the statement that now a days education is linked with the ICT.

Figure No. 1.1

Now a days education is linked with the information and communication technology (ICT)
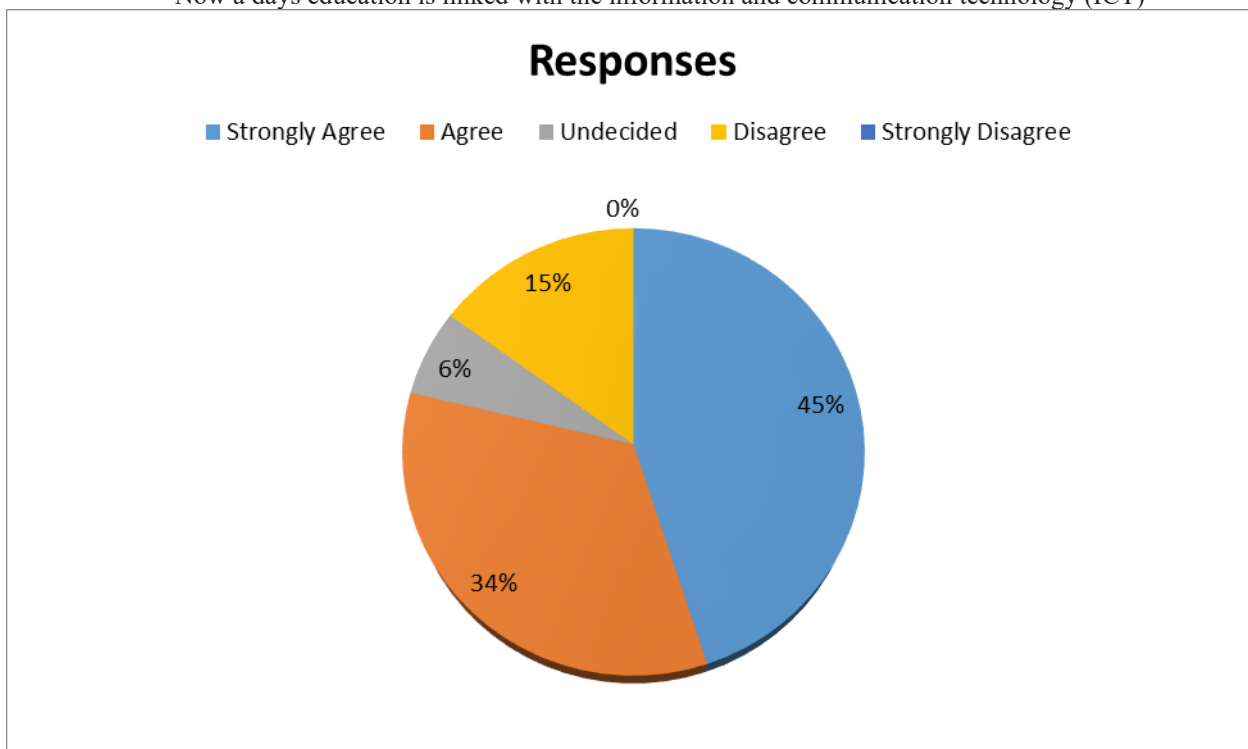
2. ICT makes the teaching learning process more effective.

Table No. 1.2

Statement	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
ICT makes the teaching learning process more effective.	39%	54%	4%	2%	1%

Table No. 1.2 shows the responses of the statement 'ICT makes the teaching learning process more effective'. In this statement 39% students are strongly agree with this statement, 54% students are agree, 4%, 2% and 1% students are responses undecided, strongly disagree and disagree accordingly. So, we can conclude that ICT makes teaching learning process is more effective.

Figure No. 1.2

ICT makes the teaching learning process more effective
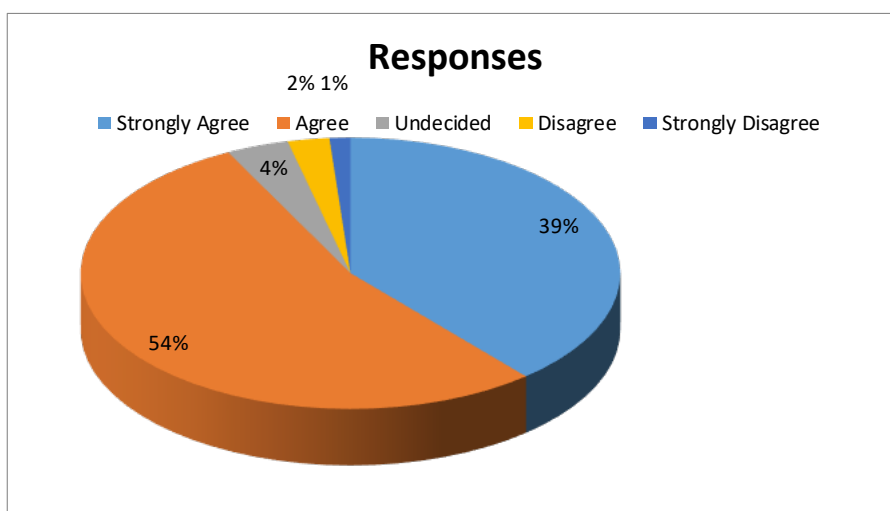
3. It is very important to include all the students in one classroom for the development of the country.

Table No. 1.3

statement	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
It is very important to include all the students in one classroom for the development of the country.	22%	66%	4%	4%	4%

Table No. 1.3 shows the responses of the statement 'It is very important to include all the students in one classroom for the development of the country'. In this statement 22% students are strongly agree with this statement, 66% students are agree, 4% students are undecided, strongly disagree and disagree. From the responses we can conclude that inclusive classroom is very important for the development of the country.

Figure No. 1.3

It is very important to include all the students in one classroom for the development of the country.
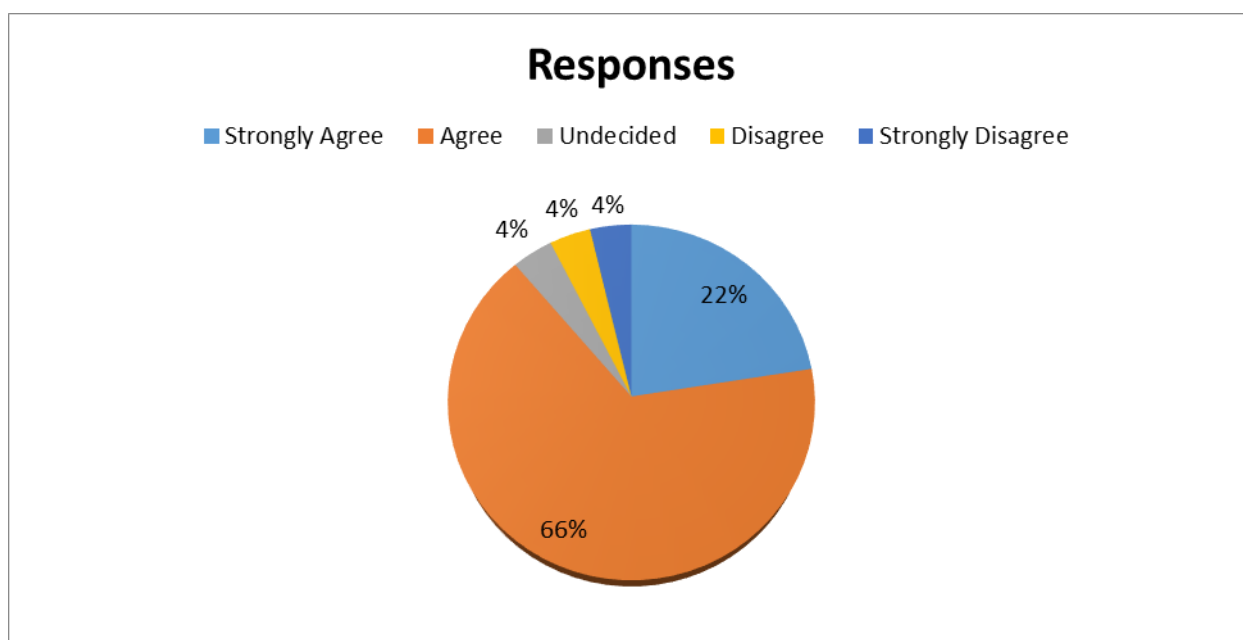
4. It is very difficult to provide education for the students with special need with the help of ICT in a common classroom along with the normal children

Table No. 1.4

Statement	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
It is very difficult to provide education for the students with special need with the help of ICT in a common classroom along with the normal children.	29%	40%	7%	19%	5%

Table No. 1.4 shows the response of the statement 'It is very difficult to provide education for the students with special need with the help of ICT in a common classroom along with the normal children'. In this statement 29% students are strongly agree with this statement, 40% students are agree, 7% students are undecided, 19% are strongly disagree and 5% are disagree. So we can conclude from the diagram that it is very

difficult to provide education for the students with special need with the help of ICT in a common classroom along with the normal children.

Figure No. 1.4

It is very difficult to provide education for the students with special need with the help of ICT in a common classroom along with the normal children
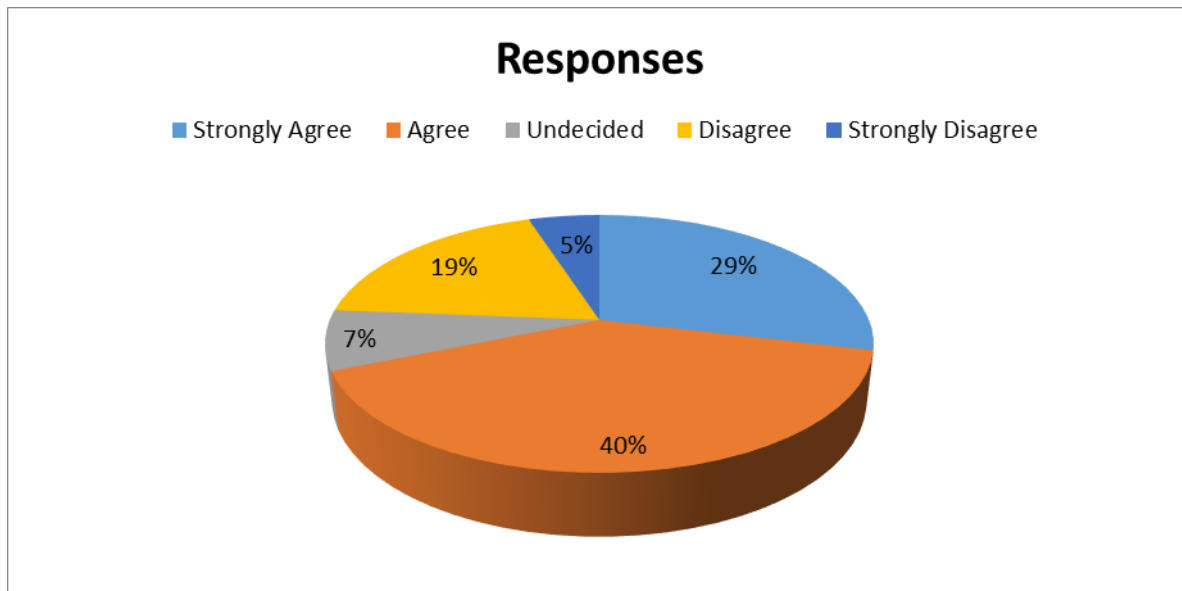
5. In North East India lack of technology, internet access, and qualified trainers etc. are the biggest challenges in providing ICT-based educational services to the masses.

Table No. 1.5

Statement	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
In North East India lack of technology, internet access, and qualified trainers etc. are the biggest challenges in providing ICT-based educational services to the masses.	61%	34%	4%	1%	0

Table No. 1.5 shows the responses of the statement 'In north-east India lack of technology, internet access, and qualified trainers etc. are the biggest challenges in providing ICT-based educational services to the masses'. In this statement 61% students are strongly agree with this statement, 34% students are agree, 4% students are undecided, 1% are strongly disagree and no one is disagree with the statement. So we can conclude that In north-east India lack of technology, internet access, and qualified trainers etc. are the biggest challenges in providing ICT-based educational services to the masses.

Figure No. 1.5

In North East India lack of technology, internet access, and qualified trainers etc. are the biggest challenges in providing ICT-based educational services to the masses
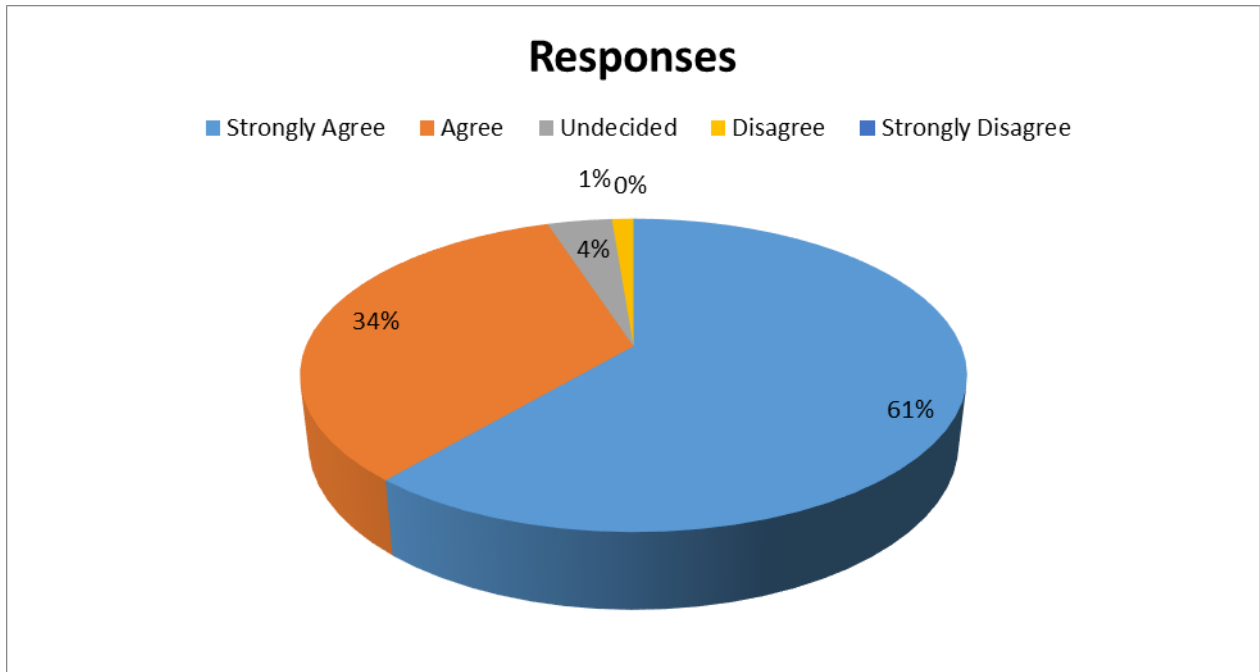
6. In North East India all the institution has provided education Trough ICT in an inclusive set up.

Table No. 1.6

Statement	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
In north east India all the institution has provided education Trough ICT in an inclusive set up.	0	5%	6%	38%	51%

Table No. 1.6 shows the responses of the statement 'In north east India all the institution has provided education Trough ICT in an inclusive set up'. In this statement no students are strongly agree with this statement, 5% students are agree, 6% students are undecided, 38% are strongly disagree and 51%disagree with the statement. Therefore we can conclude that in north-east India educational institution are not establish in an inclusive set up along with the ICT.

Figure No. 1.6

In north east India all the institution has provided education Trough ICT in an inclusive set up
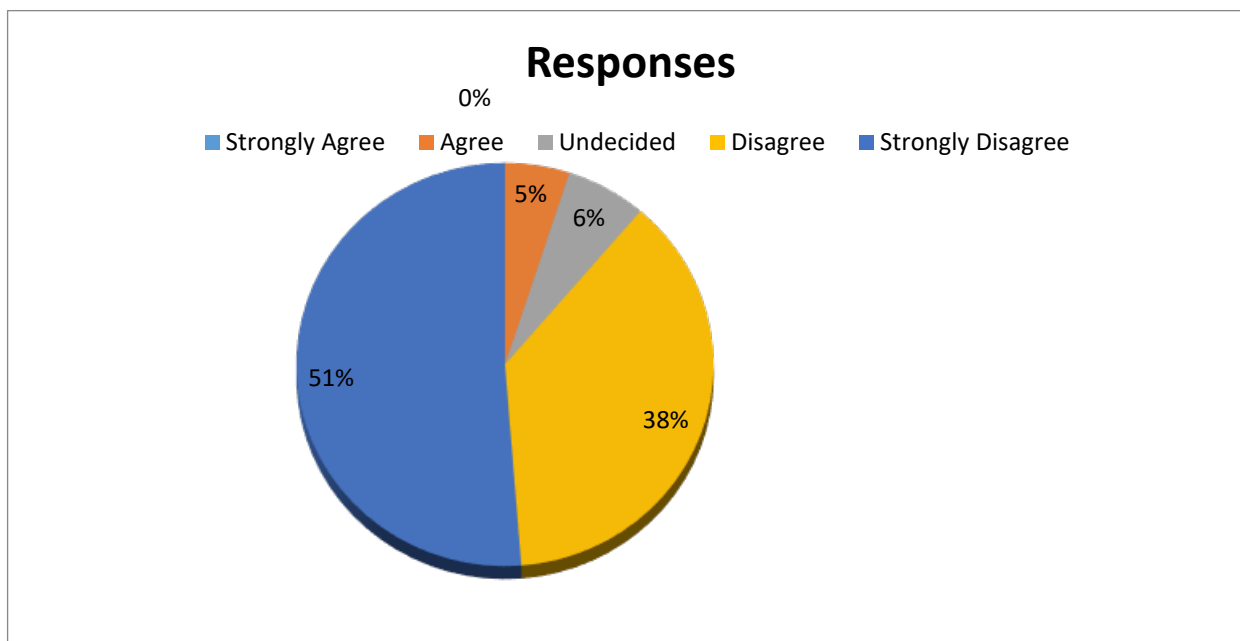
Findings of the Study

The researcher has used self-made questionnaire along with taken interview from some students who are pursuing their higher education. After the analysis of data and interview the major findings of the study are as follows-

1. It is very important to include all the students in one classroom for the development of the country.
2. It is very difficult to provide education for the students with special need with the help of ICT in a common classroom along with the normal children. Therefore, the school should build up with the necessary physical infrastructure for special children in respect of their special need.
3. In North East India lack of technology, internet access, and qualified trainers etc. are the biggest challenges in providing ICT-based educational services to the masses.
4. In the North Eastern states there are many poor families are living. Students who belong from poor family may not have their personal computer at home and with no access to the internet facilities.
5. In the North East India, there are multilingual students in a class. So teacher faces various challenges in dealing with students while using ICT.
6. One of the primary challenge in the use of ICT in education is the lack of knowledge and skills among teachers.
7. Developing countries like India the proficiency of English language is not too high expect the urban areas and major world class educational software produced in English language. So there is a barrier to maximize to profit of ICT among the students of rural area.

Suggestions

After the investigation the investigator has emerged out the following suggestions-

1) Train and skill teacher should appoint in all the educational institutions. Because without the proper training no teacher is efficient to effectively use ICT in the teaching learning situation.
2) Proper awareness should develop among all the members of the society irrespective of their caste, creed, colour, weaker section or any other disabilities.
3) Government should provide sufficient infrastructure such as computer, projector and internet facilities to all the educational institutions.
4) Attitude of teacher, parents, policy maker and peers towards special needs children should change. All of the members of the society should ensure that the special needs children can't feel inferior in the educational institutions.

5) Proper curriculum should be implemented in school that all the students can learn together irrespective of any barriers. Curriculum should focus the aim of universalization of education system.

6) School should develop all the facilities for the special needs children along with the proper resource room in school and school infrastructure should develop according to the needs of special needs children.

Conclusion

ICT and education are closely related with each other. ICT makes the whole teaching-learning process is an effective one. From the above discussion we can conclude that North-East India has lots of challenges of using ICT for inclusive education. The problem is raised due to different reason, such as lack of technology, internet access, and qualified trainers, multilingual and multicultural classroom, gap between policies and implementation etc. But for the development of educational sector for a country, Using ICT in classroom and inclusion of all the students both are the demand of the time. Therefore all the stake holder of education such as teachers, parents, policy maker, administration should work collaboratively to remove the barriers of inclusive classroom. So, on the side of policy maker they should adopt some long-term policy to remove such kind of barriers.

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DEVELOPING A WEB-BASED ENVIRONMENT FOR LEARNING TO SOLVE PROBLEMS WITH THE LINUX COMMAND LINE: THE PROBLEM-POSING APPROACH

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ABSTRACT

Computers are problem-solving tools at heart. Without an operating system though, they would be rendered useless. Most computer users are unaware of the inherent capabilities of the bare OS and the problems it can solve for them. This comes naturally in an era of commercialized solutions in the form of apps and software packages. However, gaining understanding of the built-in functions of an OS hidden behind the graphical user interface may let students discover new, personally relevant problems. In turn, attempts at formulating and solving these could help students gain complex cognitive skills in IT. This study explores the notion of problem-posing and proposes a Web-based learning environment; where users may create guides and tutorials in addition to posing their own educational problems pertaining to GNU/Linux Command Line use. Problems are stored in a repository and may be rated, reviewed, discussed or solved by peers. A virtual environment running a Linux distribution may be configured by users to accompany a posed problem and help create a complete sandbox reflecting the problem's story and structural elements.

INTRODUCTION

One of the most important goals of education is to prepare the individual for daily life, which frequently involves situations that require solving problems (Jonassen, 2011, p.17; Krathwolh, 2002; van Merriënboer, 2013). Therefore, it is very important for educational settings to help foster problem-solving skills pertaining to daily and professional lives (Gagne, Briggs, & Wager, 1992). Considering the cognitive skills hierarchy however, problem-solving is usually considered a complex task. This, and the fact that problems come in all sizes and shapes, renders the teaching of how to solve problems a great challenge.

Many researchers have spent effort on classifying educational attainments by grouping learning outcomes contextually. For example, Gagne (1992) groups learning outcomes in a manner that associates simple problems (problems that may be solved by applying a single rule) with the notion of rule-learning, while explaining that the solution of more complex problems is the highest level of intellectual attainment. Another classification is made in Bloom's taxonomy, which displays problem-solving at multiple levels of the top-down hierarchy: whereas the solution of certain problems fall into the application level, others may correspond to higher order thinking skills found in the levels of analysis, synthesis or even evaluation. The taxonomy was revised in the year 2001 (Krathwohl, 2002) and in the revised version, it may be seen once again that problem-solving requires skills ranging from the level of application to creation (Thompson, Luxton-Reilly, Whalley, Hu, & Robbins, 2008).

The reasons for representing problem-solving in multiple levels of a cognitive skills hierarchy may be evident upon inspecting the works of Jonassen on the notion of problem-solving learning (Jonassen, 2011). Jonassen explains that problems encountered in school, or in our daily lives come in all shapes and sizes and thus assigns them into different categories. There are many factors that determine which category a problem falls into. The most important one among these, however, may be considered as the so-called problem-structuredness. From an educational perspective, well-structured problems are those that are usually encountered in schools. At the end of each chapter in every textbook, examples for this kind of problems, which most likely have a single correct answer and offer all prerequisite information for their solution within the problem text, may be found. And mostly, solving these require skills that fall under the category of Gagne's rule-learning (Gagne, Briggs, & Wager, 1992), or the application category in Bloom's taxonomy. However, there also exists another type of problems referred to as ill-structured problems, which are encountered more frequently in daily lives. These usually do not have a single correct answer, nor the information required for their solution may always be readily available. Examples to ill-structured problems include "Which car should I purchase?" or "How may I develop a

Web application?" or "What should be design specifications or technical features of a new smartphone be?". All in all, it may be understood that solutions of ill-structured problems are represented as higher-level cognitive skills by both Gagne and Bloom.

A glance at the literature shows many researchers suggesting the use of worked examples in teaching how to solve well-structured problems (Sweller & Cooper, 1985; Paas & van Merriënboer, 1994; Renkl & Atkinson, 2003). It has been proposed that worked examples reduce cognitive load especially in novice learners and help them develop strategies in tackling educational problems. Researchers also advise that the transition into problem-solving may be smoother by using backward completion problems and that taking a large step into problem-solving learning by disregarding the use of worked examples is not recommended (Renkl & Atkinson, 2003). No matter how difficult or time-consuming a well-structured problem may be, or however many different parameters its solution needs to take into account, familiarity with the rules that govern the problem's internal structure may become transferrable in time, rendering the act of problem-solving a routine task. This would reduce the cognitive effort it would take for subject matter experts working on similar, well-structured problems, taking the task to the level application in Bloom's taxonomy (Thompson, Luxton-Reilly, Whalley, Hu, & Robbins, 2008). However, the same could not be said for ill-structured problems since there may always be multiple paths to multiple outcomes that may pass as solutions. Nievelstein, van Gog, van Dijck & Boshuizen (2013) have shown in their study the reverse effect of expertise arises quickly in the solution of well-structured problems, as opposed to ill-structured ones where such an effect is not observed. This Expertise Reversal Effect has been defined by Kalyuga (2007) as "the reversal in the relative effectiveness of instructional methods as levels of learner knowledge in a domain change". In working with well-defined problems, it is the limited size of the problem space that leads experts to experience this phenomenon. In the case of ill-structured problems, however, there is usually a wider problem space that may result expertise reversal to not occur even in the most experienced and knowledgeable individuals. In short, the effect is experienced in problem solving tasks that are reduced to the lower cognitive skill level of application, whereas it is not displayed in problem-solving that requires higher order skills. And even though the use of worked examples in learning how to solve well-structured problems has been extensively researched, the notion using these in teaching how to solve ill-structured problems seems to be overlooked (Nievelstein, Van Gog, Van Dijck, & Boshuizen, 2013; Frerejean, van Strien, Kirschner, & Brand-Gruwel, 2016). Jonassen (2011) explains that cases as problems to solve may be used in teaching how to solve ill-structured problems just as they are used with well-structured problems, since students may investigate cases and use these as analogies later on, in addition to gaining prerequisite information and developing an alternative perspective in the investigation process. Needless to say, the cases presented to students as problems to solve need to display certain educational qualities (Nicol & Krykorka, 2016). Jonassen (2011) therefore concludes that a good educational problem should be (a) interesting and relevant to the solver, (b) complex and/or ill-structured, (c) authentic and rooted in real life, and (d) designed in a fashion that takes into account the context, representation mode and manipulation space.

Jonassen (2011) also expresses that the motive behind problem-solving learning activities is not limited with the need for finding and implementing an acceptable solution. These activities also prepare a student to more easily recognize and solve future problems she may encounter and help her develop skills -metacognitive or otherwise-that reduce the mental effort in doing so. As previously stated, the main goal is for students to successfully transfer their problem-solving skills to real life scenarios. In a relevant study, Perkins and Salomon (1992) list the requirements for learning transfer to occur as: 1) thorough and diverse practice 2) explicit abstraction 3) active self-monitoring 4) arousing mindfulness and 5) using a metaphor or analogy. It might be said that, in order to have the skill of problem-solving be transferred to real life scenarios, mundane problem solving tasks may not be sufficient. Learning environments may need diverse educational activities in problem-solving education where existing problems serve as analogies for others and where higher order cognitive and meta-cognitive skills are also used in the progress. One such example for these diverse activities is problem-posing.

Problem-posing is a concept popularized in academic literature by Brazilian educator Paulo Freire. Freire's approach to problem-posing is rooted in the tenets of Critical Pedagogy and it suggests an approach where the student is playing a more active role in the educational setting. In his Problem Posing Education, Freire envisions a classroom where students may sincerely and openly share with their peers problems that affect their personal lives and are not reluctant to argue on or take action towards the solution of these. Voiced by students themselves, the collective attempts at solving these problems of personal or societal nature turns education into liberatory praxis. In other words, this progressive concept aimed to utilize education to benefit students by enabling them to develop some kind of sensitivity towards their own problems, as well as those of others and of the society, thus breaking down the invisible wall between "school" and "real life". Thus, problems posed by students in a classroom where the pedagogical approach of Freire is pursued are expected to be quite different than, well-structured problems such as algorithms or story problems; often illustrating "cases" that are relatively

more complex and that may have multiple solutions or none at all.

In time, the concept of problem-posing found its way into educational domains where problems are typically well-structured, such as mathematics or natural sciences. Especially beginning with the work of Silver (1994), the notion of "mathematical problem-posing" has been popularized in the academic field of mathematics education. Freeing itself of the "mathematical" prefix in time, this approach was simply referred to as "problem-posing", "question-posing" or "student question generation" (Khansir & Dashti, 2014; Lai & Liang, 2017; Lan & Lin, 2011; Shakurnia, Aslami & Bijanzadeh; 2018, Yu & Chen, 2014; Yu, Liu & Chan, 2003) and defined as a technique based on creating new questions about a given scenario (Mishra, 2014) or the act of posing problem situations in order to generate or discover new information (Mishra, 2014; Mishra & Iyer, 2013). Nevertheless, student efforts on posing their own problems has been claimed to be beneficial in the way of developing higher order cognitive skills; regardless of whether the problems are ill-structured ones derived from actual, distressful circumstances in life, or; well-structured ones that are artificial, abstract and most-likely forgotten once the textbook cover is closed. Indeed, it has been suggested that one of the main goals of problem-posing activities is for problems posed by students to display a higher level of cognitive ability of the poser (Profetto-McGrath et al. 2004). It has also been claimed that students posing their own questions/problems in a given subject helps them improve their understanding, motivation, problem-solving skills, cognitive and meta-cognitive strategies, group communication skills, active learning behavior, flexible thinking and positive attitude towards subject matter (Kopparla et al., 2018, Yu & Chen, 2014). For this reason, including problem-posing activities in a problem-solving education context may facilitate the progress of learning to transfer problem-solving skills to real life.

Training for the GNU/Linux Operating System
Goldweber (2015) claims that the principal and most important learning outcome for students in fields such as IT and programming is not the display of mastery over the rules and syntax of a programming language but a general understanding of the computer is capable of doing and what kind of problems it can solve for the student.

Operating Systems is one of the indispensable courses in the curricula of most college-level educational programs offering degrees in (or related to) Computer Science. Although this course is widely offered, it has been observed that the instructional process in this course generally limited to helping a student gain understanding of operating systems and their components at a general knowledge level (Yodaiken, 1996; Yang & Wei, 2007). In other words, de facto learning outcomes of this course are usually associated with lower levels of cognitive skills in Bloom's hierarchy. However, the actual purpose of this course should not be limited to enabling the student to gain a holistic understanding of the concept of operating systems or to understand the intricate relationships between its sub-components. There also exists the fact that operating systems are the essence of a computer, without which the device would lose its identity as a problem-solving tool. Therefore, students completing the operating systems course should be expected to perceive the operating system as a problem-solving tool, gain some kind of sensitivity towards daily life problems that may be solved using it and lastly, learn to use it effectively to overcome the said problems.

Offering a large amount of transparency and universality, the highly popular family of GNU/Linux (or shortly, Linux) operating systems have been claimed to be a popular choice in problem-solving oriented computer science curricula (Adams & Erickson, 2001; Chong, 2008). In addition to the educational value it possesses, expertise in Linux use is a highly sought after skill in today's IT industry, and universities may do well to teach the general use and system administration of the Linux family of operating systems to computer science students (Rogers, 2000).

A review of the literature has failed to reveal attempts at discovering novel methods in teaching the use of the Linux operating system. However, one study worthy of note has been carried out by Dall and Nieh (2015) in Columbia University. In this research, a Web-based assignment grading environment named GradeBoard has been developed in order to facilitate teaching the subject of Linux Kernel Development. Making use of the Git version control system, it enables students to submit their homework assignments for review by their instructors, who provide them with feedback over the same environment. However, to the understanding of the authors, this system does not make use of peer-interaction or problem-based pedagogies. It has been noted in a recent study that education in the use of Linux operating system needs to include hands-on problem solving activities just as much as they include presentation of rote knowledge and yet; it is a difficult process to design and choose educational problem cases for use in this manner (Xu et al., 2014).

There exist numerous design based research efforts in the literature, where educational software solutions are used alongside problem-based pedagogies. Some of these also cover the domain of problem-posing. However,

Lai and Liang (2017) reports that the limited number of studies that aim to develop a software system to assist problem-posing activities have certain limitations such as a) being developed with a generic mindset and not with a purpose of supporting a specific course subject and b) incorporating only multiple-choice type questions and not open-ended ones. To the author's information, there is currently no study investigating the specific domain of operating systems education in the context of software systems assisting open-ended and ill-structured problem-posing activities.

PURPOSE

This descriptive case study investigates the implementation of a web-based learning platform that is still under development for the purpose of employing problem-based pedagogies in teaching GNU/Linux operating system fundamentals to college students in an operating system course (the Platform) within the context of the problem-posing cognitive process initiated by students during their interaction with the platform. Both qualitative and quantitative methods are employed to produce the most convincing body of evidence. The data collected with both methods are used to answer the following questions:

1. How does the quality of educational problems posed by students change after the implementation of the Platform within the Operating Systems course in the proposed manner?
2. Is there a correlation between student academic achievement and the quality of student-posed authentic educational problems?
3. What were student opinions on the use of the Platform, whether their satisfaction changed through the course, if yes how?
4. What were students' opinions on the problem posing activities, and how did they engaged with the Platform to complete problem posing duties?
5. According to the students, how could the design and implementation of the Platform be improved to attract students and better scaffold student generation of higher quality educational problems?

METHOD

This descriptive case study comprises preliminary work and the first iteration of a design-based research project. According to Bakker and van Eerde (2015), design based research aims to formulate research questions and hypotheses that, when answered, will delineate a) what properties a product or intervention that has been designed for a specific purpose should carry or, from a broader perspective, b) how a desired effect may be achieved under specific circumstances.

Developing the Platform

A Web-based software application was developed for use in the Operating Systems course as an educational platform that facilitates learning to use the GNU/Linux operating system command line as a problem solving tool and transferring these skills to real life scenarios. The following observations of the course instructor based on classroom experiences have been the starting point for designing such a tool:

- Regarding the use of the Linux command line, Turkish students are having hardships following educational material in the English language and having trouble finding quality material prepared in Turkish.
- Students are reluctant to install the Linux operating system on their personal computers with fear that they may break their computer and/or lose sensitive data.
- Students harbor prejudice against command line emulators, which they refer to as "the black screen", and are unaware that most tasks they carry out using a GUI can be carried out just as efficiently, if not more, using the command line.

In the design phase, two very important resources regarding the training of complex cognitive skills have been referred to. One of these is the 4C/ID instructional design model developed by van Merriënboer (1997) and the other is the instructional design model offered by Jonassen (2001). The learning outcomes on problem-solving that this design seeks to enhance may be considered under the design-problems category of Jonassen's problem typology and the researcher's advice in this particular context has been heeded. Jonassen (2011) especially mentions the advantages of using numerous cases as problems to solve in the way of providing providing prerequisite information, sources of analogies and means of exercise. As for the 4C/ID model, problem cases are utilized for providing students with items for whole task practice. With this rationale, the goal has been set to create a learning environment that houses a repository of problem cases that can be solved mainly by using the Linux command line, along with their detailed solution steps. In this proposed model, however, the difficult task that is the generation of cases posing high quality educational problems lies on the shoulders of the lecturer, who would most likely base all the problems on her own experiences.

As stated above, one of the main purposes teaching the fundamentals of the GNU/Linux should be to prevent students from passing the course without really realizing that the operating system, without which the computer would be reduced to a mere heap of semiconductor, is actually a problem solving tool. In order to address this issue and to (a) help students enjoy the aforementioned benefits pertaining to cognitive processes as promised by Silver's problem-posing technique; (b) let students develop a critical perspective by letting them bring real world problems into the classroom and giving them a chance at praxis, as proposed by the Freirean approach to problem-posing; (c) enable the creation by students of multiple problem cases defined by Jonassen as sources of practice and analogies, which would be students to be solved by their peers, and; (d) enable the creation by students of whole task practice items as proposed by the 4C/ID model; the decision of including problem-posing method has been taken. This way, students may work as generators of questions/problems that may initially be used in part-task and later in whole-task practice sessions. The quality and quantity of student generated problems is expected to increase over time while students benefit from the pedagogical affordances of problem-posing technique that enables fostering of several cognitive and meta-cognitive skills.

In the case of this study, problem-posing activities are also expected to increase the awareness of students towards problems that may be solved using the Linux command-line as a tool while they try to pose educational problems that reflect real life scenarios. It should not be forgotten that although students tend to display negative prejudice towards the "black screen" in the Desktop Era of computing, the computer is a problem solving tool at heart and even if it may sound like a high-brow remark, the command line is the computer itself. According Stephenson (1999), interfaces such as GUI tend to set a distance between people and the computer, making it harder for them to understand the core mechanics of the device and act as layers of abstraction that may lead to alienation. There are cases where computing problems that may be solved in mere seconds using programmatic commands issued over the command line may take hours using the GUI, or may not even be solvable. The purpose of using problem-based pedagogies in Linux command line training is to help students be able to solve by themselves or at least identify and articulate these kind of problems, which may come in a wide array of contexts.

Eventually, the Platform was planned to be an open and collaborative learning environment where students may pose their educational problems related to the basics of Linux command line use and solve problems posed by their peers.

Structural and Technical Features
Following the previously mentioned general principles, a web-based software application prototype, where students may author two kinds of educational materials, namely "guides" and "problems", has been developed and served over the Web.

As the name suggests, "Guides" refer to student-created tutorial pages on various concepts regarding UNIX-based systems; as well as commands, utilities and programs that are specific to the Linux command line. The inspiration for this type of educational material has been information on most commands found in the man and --help pages generally accessible over the Linux command line. The initial idea has been to randomly assign each student 5 entries from a list of 50 basic commands/utilities/programs and let them create educational guides in Turkish language on the usage of these. Later, each student was to be assigned 10 randomly selected guides from a pool created in this manner and edit the content generated by their peers (whose names have been hidden for the purpose of anonymity) to perfection. This process involved the students in (a) making use of the man and – help pages, as well as resources on the Internet to come up with a general understanding (b) testing out their findings on a command line emulator; and (c) explaining to their peers the knowledge they constructed in this manner. A screenshot from the gallery of student generated guides uploaded onto the Platform has been given in Figure 1a.

The educational material "Problem" refers to educational problems posed by students on the platform. These represent the output of problem-posing activities. For the creation of this type of material, students have been asked to initially create a text that reflects a problem case, the scenario of which can be traced back to a real-life context, preferably inspired by their own experiences, needs or demands. After this, they were asked to configure a sandboxed environment powered by a virtual machine running a Linux distribution to reflect the structural elements of the problem case they created, so that the end result is a "problem space" where peers may attempt at solving the problem posed. A screenshot showing a sandboxed problem space that features (a) the problem text, (b) the command line for the virtual machine configured to reflect the problem and (c) messaging area has been shown in Figure 1b.

In order to enable users to create such problem spaces, the Platform was built in a way that lets users instantly launch remote virtual machines running a Linux distribution and access these from over a browser-based command line console. For this purpose, the Docker system based on the LXC architecture has been employed to launch containers running an Ubuntu system image. As for accessing these containers, an open source terminal emulator that runs in the web browser named shellinabox (https://github.com/shellinabox/shellinabox) has been used, as proposed by Morell and Jiang (2015). This way, users may instantly create Linux virtual machine instances that they can access and configure from over a web browser, associate these with both types of instructional materials (guides and problems) and even work collaboratively with terminal screen sharing and recording tools packages such as ttyrec and GNU Screen.

The Platform itself is a web application prototype developed using the isomorphic JavaScript application development framework Meteor, used commonly in rapid-prototyping Web projects (Fiala, Yee-King & Grierson, 2016) and which makes use of a document-based MongoDB database, as well as the Websockets protocol and the

(a)   (b)
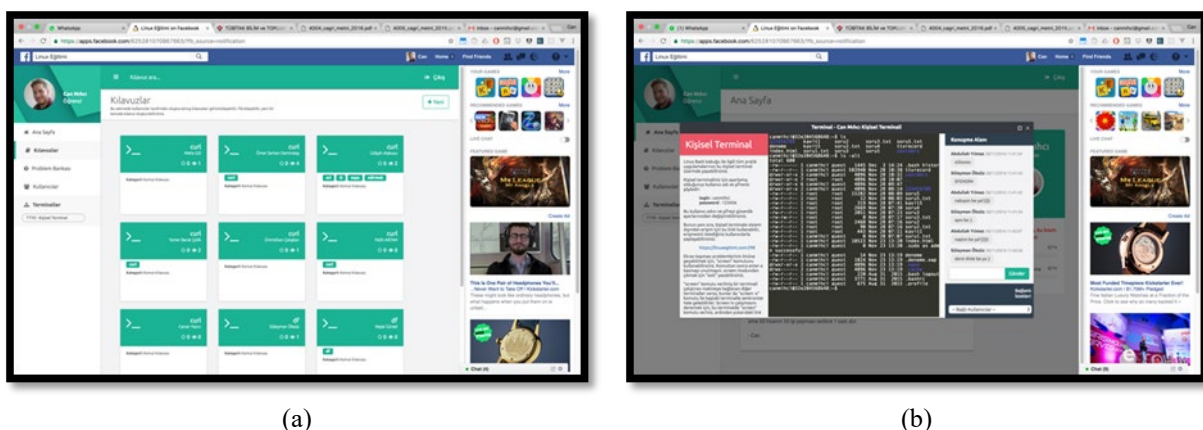
Figure 1. Screenshots of the Educational Platform (accessed in this instance over the Facebook Social Network as an integral application)

DDP technology to enable real-time interaction between users. The Platform has also been integrated with popular social networking services (SNS) of Facebook and Google+, enabling OAUTH based user login. Another reason for this design decision has been to provide users with timely notifications over SNS in order to engage them more closely. A screenshot showing the login screen of the application running within a frame as a Facebook app has been shown in Figure 1a. A profile is created for all users registering in the system and SNS integration allows for more complete profile pages, with avatar pictures.

Implementation
The Platform has been implemented in the last 7-week half of a 14-week long operating systems course in order to find answers to the research questions and to gather feedback for guiding further design and development efforts. The implementation took place with 45 students (K12 Computer Science Teacher Candidates) enrolled at the 3rd year Operating Systems course during the autumn semester of the 2016-2017 academic year of the undergraduate program of Computer Education and Instructional Technology at a Turkish University Faculty of Education. Qualitative data have been gathered from these students at the beginning and end of the implementation period.

In the first 7-weeks of the course that passed before the implementation stage started, the goal has been to let students gain prerequisite knowledge and skills required for problem-solving / problem-posing activities pertaining to Linux command line use. This involved regular coursework, with hands-on practice at computers in running Linux in a school laboratory, as well as homework practice using the Codecademy "Learn the Command Line" module, which offers a MOOC that teaches Linux command line basics using a sandbox environment (Codecademy, 2019). This decision was made so that students may become familiar with working in a sandboxed virtual environment accessed over a browser during the implementation. Based on anecdotes from previous years suggesting that students are having trouble working with content in English language, the course instructor has developed and shared with the students a Google Chrome browser extension, which translates Codecademy module content into Turkish.

With the coming of the midterm, the Platform was implemented into classroom activities, as well as into homework assignments. A rough schedule of the course activities related to the use of the Platform has been given in Table 1.

Data Collection Tools
Rubric for Evaluating the Quality of Educational Problems Related to the Linux Command Line
Jonassen (2011) explains five external characteristics for educational problems as (a) structuredness, (b) context, (c) complexity, (d) dynamicity and (e) domain specificity. Inspired by explanations made by Jonassen in this

Table 1. Weekly schedule of course activities related to the use of the Platform.

Week #	Activity
1-5	(a) Introduction to Operating Systems related concepts and the Linux Command Line. (b) Theoretical and practical coursework, (c) homework assignments at Codecademy Learn the Command Line module. (d) Creation of tutorial "Guides" by students for command line concepts randomly assigned to them.
6	**Alternative Question Posing:** A classroom activity at the computer laboratory where students were handed question paper from last year's midterm exam and were told to create a new question based on each one shown on the paper, considering the cognitive skill level targeted by the question, as well as its structure, difficulty and score.
7	(a) Introduction of the platform at Linuxegitimi.com, (b) Uploading of alternative questions created during Week 6 on the Platform, (c) Uploading of tutorial guides created in weeks 1-5 to the Platform.
8	Gathering of initial student opinions on the Platform following one week of use, via the First Impressions Questionnaire administered online.
9-11	Use of the Platform throughout classroom sessions, instead of the native command line interfaces of school laboratory computers.
12-13	**Authentic Problem Posing:** Homework activity that requires students to work in pairs and pose an educational problem that conforms to certain criteria.
14	(a) Final Exam for the course administered over the Platform, student responses recorded with a terminal session recorder (ttyrec) and grading was carried out over the recordings. (b) Final Evaluation Interviews.

context and also based on his previously referenced definition of what qualities a good educational problem should possess, the authors have developed a Rubric for Evaluating the Quality of Educational Problems Related to the Linux Command Line (the Rubric). The sub-categories of the Rubric, all of which can be scored in the range of 0 to 3, can be given as follows with their weight multiplier given in parentheses next to their names: (a) Problem Situatedness (x5) - the degree to which the specific situation in which the problem takes place is related to the problem (Lee, 2004), (b) Story Context (x3) - the degree to which a problem presents a convincing story most likely reflecting a real-life scenario, (c) Problem Complexity (x3) - the amount of cognitive effort it would take to solve the problem, and; (d) Structural Uniqueness (x6) - the measure of how unique a given problem is based on its structural elements. A product of scores in each category with their relevant modifiers are added together to represent a final measure of a problem's overall quality, which may range between 0 and 51. The final look of the Rubric has been given in Table 2.

Alternative Question-Posing Activity
An exam form applied as the actual midterm exam of the Operating Systems course in the previous year was shared with the students for this activity. This exam form included 6 questions that measured knowledge in topics of the course up until midterm. All the questions in this form, except for question 2, lacked a narrative and consisted of simple instructions or demands for an answer. The students were instructed to create a new exam form that is similar to the one handed to them and were notified that their performance would affect academic success in the course. The criteria for success in the activity has been explained as "creating an alternative question for each of the questions in previous year's exam form, considering each question's score as well as the level of cognitive skills involved". In other words, the question's in previous year's midterm exam have been given to students as starting points for posing similar questions/problems. Being prospective computer science teachers and undergraduate students in a faculty of education and having passed pedagogical courses in previous years, participant students were assumed to be familiar with taxonomy of cognitive skills. The activity took place at the 6th week of the course, lasted 90 minutes and students were free to use the computers to access resources. Brief explanation about questions in the form, as well as their target cognitive skill level were given in Table 3. Student performance in this activity was measured using the Rubric for Evaluating the Quality of Educational Problems Related to the Linux Command Line.

Authentic Problem-Posing Assignment
At the 12th week of the course, students were asked to work in pairs for 2 weeks and pose an educational problem pertaining to the use of the Linux command line. It was explained that performance in this activity

would affect their final exam scores and the scoring criteria has been shared with them. The criteria required the students to pose a problem that (a) had a convincing narrative derived from real life, possibly their own; (b) was complex enough; (c) was unique; (d) involved solution steps and (e) was delivered before the deadline. It was also noted that failure to comply with any one criterion would merely lower their score and not be interpreted as total failure. In order to standardize the presentation of problems posed, an empty template has been shared with students. This was the same template that the instructor had used throughout the course to deliver her own worked examples to students.

Table 2. Rubric for Evaluating the Quality of Educational Problems

Sub-Category (multiplier) / Score	0	1	2	3
Situatedness (x5)	The posed question / problem has nothing to do with the command line.	The question/problem seems to be related to the command line. But it is actually related only with peripheral subjects (such as keyboard shortcuts). Or, it represents a situation where using the GUI would be more beneficial than the command line.	The question/problem is directly related to command line use. However, it is not situated in the particular context of Linux or UNIX or does not require use of GNU tools. Example: Simple file system manipulations that could be handled in a similar manner under Windows command line.	The question is directly related to the use of Linux command line. It involves the use of tools such as package managers and/or concepts such as disk mounting that are rather specific to Linux-based systems.
Story Context (x3)	The problem does not pose a story. All its structural elements are bared. There are only instructions / givens.	Question/problem displays a weak attempt at forming a narrative. This narrative is probably just an excuse to hide structural elements, there is no rationality for an actual problem.	The problem/question is presented with a narrative that tries to explain and rationalize why the situation is an actual problem that causes distress..	The problem has a convincing story and a strong narrative displaying an interesting and problematic situation that could have been encountered in real life. It may also convey the meaning of being personally significant to its poser.
Complexity (x3)	The posed question/problem is not actually answerable / solvable.	The problem can be solved in a single step. In the case of questions, it only requires display of lower level cognitive skills such as recalling rote knowledge..	The solution of the problem requires knowledge application and organization. Such as, solving a problem related to command line use by issuing certain commands in the correct order. However, programmatic constructs are not employed in the process. In the case of questions, it requires higher order skills such as summarization, explanation or categorization.	The solution requires actions in multiple domains of knowledge (e.g. both file system operations and network configuration and user account management). Or, it may also be that the solution makes extensive and/or creative use of programmatic structures. As for questions, answers require higher order skills such as interpretations.
Structural Uniqueness (x6)	The question / problem has been entirely copied from another source. It may also be that a few of its parameters have been changed without altering structural features.	The question/problem is heavily inspired by an example with modifications / additions to its structure.	The question/problem posed is not structurally inspired by previous examples encountered during the course but is probably pertaining to a case / concept that may routinely be encountered during daily use of the Linux operating system or the command line.	The question/problem features a structure that is quite unlike previous examples and it is pertaining to a concept/case that is most likely out of the scope of daily use of the Linux OS / command line.

Table 3. Information on Questions in the Previous Year's Midterm Exam

Q#	Cognitive Skill Targeted by Question	Brief Explanation of the Question Content
1	Understand (conceptual)	Instructs the student to summarily explain a concept pertaining to Operating Systems in general.
2	Apply (Procedural)	Mentions an example case where a user intends to install the GNU/Linux operating system is given as a weak narrative and the question requires the student to explain the steps to carry out this task.
3	Remembering (factual – conceptual)	Instructs the student to give information on peripheral knowledge pertaining to the Linux Command Line, such as meaning of special symbols or keyboard shortcuts.
4	Apply (conceptual)	Instructs the student to correctly write the few commands that carry out the given simple tasks

5	Apply (conceptual) or Create (conceptual) (based on students' existing knowledge)	Instructs the student to create a Bash script file that includes several lines of commands and serves to fulfill a particular goal when executed.
6	Analyze (conceptual)	Requires the student to overview and explain the purpose of a rather long and complex chain of commands, some of which were not previously taught during the course and which, unbeknownst to the student, has a real-life use context.

Student performance in this activity was also measured using the Rubric for Evaluating the Quality of Educational Problems Related to the Linux Command Line

First Impressions Questionnaire
At the end of the 8th week of the course, students were asked to voluntarily and anonymously respond to a questionnaire with eight open ended questions delivered online over Google Forms and in doing so express their opinions about the Platform. Questions sought to uncover the experience students have had using the Platform, the perceived purpose of using the Platform in this course, their overall satisfaction with the Platform and with problem-posing activities as a whole. Qualitative data collected with this form has been analyzed through content coding.

Final Exam
At the 14th week, the Final Exam for the course, measuring academic achievement in learning how to operate the Linux Command Line, has been administered to students. The exam, which was scored over 100 points, took place in the school computer laboratory as a practical test that required the students to carry out specific tasks on the Command Line. However, students used the Command Line interface at the Platform to submit their answers in the form of screen recordings captured with the ttyrec command line tool. The instructor has graded student answers by watching the recordings and observing student performance during attempts at answering questions, instead of evaluating the final product as an answer.

Final Evaluation Interviews
After the semester has ended, one-on-one interviews have been conducted with students in order gather information on the ways they engaged with the Platform, as well as the processes they went through in problem-posing activities. Participation in the interviews was voluntary. Overall, 8 students were interviewed. Qualitative data collected in this manner has been analyzed through content coding.

FINDINGS
First Impressions
The First Impressions Questionnaire was answered by 29 students out of 45. Responses were treated as qualitative data and themes along with their categories were formed by content coding. Each category and their subsequent themes have been given in Table 4, with numbers in parentheses representing the number of times a theme has been coded.

Quality of Problems Posed by Students
Throughout the course, each student was tasked with posing 7 types of questions / problems and sharing these with their peers over the Platform. Six of these were questions / problems that were posed as alternatives to each of the six questions in the previous year's midterm exam, whereas the seventh problem was the product of the Authentic Problem-Posing Assignment. All the questions / problems were scored using the Rubric for Evaluating the Quality of Educational Problems Related to the Linux Command Line. Descriptive statistics for the distribution of scores for each question type posed has been given in Table 5.

In order to compare differences between quality of problems posed by each student in the group, a repeated measures statistical analysis of variance was intended to be used. However, several assumptions for this test failed, due to non-normal distribution and missing data in a block design comprised of related samples.

A Skillings-Mack test (Hollander, Wolfe & Chicken, 2013; Chatfield & Mander, 2009; Skillings & Mack, 1981) has shown that average scores in at least one of the problem categories were significantly different than the rest $\chi^2(6) = 82.51$, $p < 0.05$. Post-hoc analysis with Wilcoxon signed-rank tests was conducted by excluding cases with missing values in a test-by-test basis and it was found out that rubric scores for problems posed during the Authentic Problem-Posing Assignment were significantly higher than scores of questions posed based on Q1 ($Z = -4.704$, $p < 0.05$), Q2 ($Z = -4.664$, $p < 0.05$), Q3 ($Z = -3.979$, $p < 0.05$), Q4 ($Z = -2.862$, $p < 0.05$), Q5 ($Z = -2.974$, $p < 0.05$) and Q6 ($Z = -3.347$, $p < 0.05$) in the Alternative Question-Posing Activity.

In order to find out whether a correlation exists between student academic achievement and quality of authentic

student-posed problems, a Spearman's Rank-Order Correlation test was carried out between Final Exam scores and Authentic Problem-Posing Assignment Rubric Scores for 31 students that both took the exam and finished the assignment, which yielded no significant results (rs(29) = .297, p = .10)

Table 4. Categories and Subsequent Themes Discovered in the First Impressions Questionnaire.

Frequency of Visits
(10) Frequently visited
(11) Visited once or twice
(4) Never used
    (2) generic excuses
    (2) lack of time
(4) Visited mostly during the weekend before the course

Experience Using the Platform
(7) Easy to use, no problems to report
(11) Reporting technical problems
    (5) Slowness
(7) Reporting structural problems
    (4) Difficulty finding own content in the content pool

Content-related
(9) Finds peer-generated content low quality
    (2) Needless use of sandbox feature
    (2) Plagiarized content ("copy-paste")
(4) Found high-quality peer generated content
(3) Viewed peer-generated content with curiosity on "how others have performed"
    (2) Peer-generated content too similar to one another

Interaction with Peer Generated Content
(7) Did not examine peer-generated content.
(9) Examined peer-generated content, however partially.
(4) Meticulously examined peer-generated content.

Perceived Purpose of Use
(16) To practice using commands "without installing Linux"
(17) A source of information on course-related topics
(10) A repository for storing and sharing educational content created by students through homework activities
(17) A social learning environment…
    (6) … where future users may benefit from currently generated content
    (7) … where personal problems may be shared and help may be received from peers in solving these
    (4) … where peer-generated questions may be used as practice material
(11) A communication tool between students for course-related topics
(7) Mentions lack of course related resources in Turkish language
(3) Mentions a likeness with "Codecademy"

Recommendations
(4) Review of all content by an expert to prevent generation of useless or harmful content
(4) Feedback from an expert
(2) Grouped / ordered presentation of content
(2) Tutorial videos should be added
(4) Ability to search/filter content
(3) Detailed user profiles should be added
(2) Collaborative content-editing (Wiki style)
(2) Instructor should also upload content

Table 5. Descriptive Statistics showing Problem Quality Rubric Scores for Each Category of Problems Posed

Posed Problem Based on	N	$\bar{X}$	S	Posed Problem Based on	N	$\bar{X}$	S
Alternative Question Posing Q1	38	11.44	7.01	Alternative Question Posing Q5	28	22.89	8.92
Alternative Question Posing Q2	38	13.15	8.60	Alternative Question Posing Q6	33	23.84	5.20
Alternative Question Posing Q3	38	20.84	8.09	None (Authentic Problem-Posing Assignment)	31	32,09	8.83
Alternative Question Posing Q4	37	22.45	7.62				

Final Evaluation
Eight students participated in semi-structured interviews that lasted half an hour on average. Student responses have been treated as qualitative data and themes along with their categories were formed by content coding of student responses. Table 6 shows categories and their relevant themes, with numbers in parentheses representing the number of times a theme has been coded.

DISCUSSION
Quality of Problems Posed by Students
Students have been given a chance at posing their own problems at two main occasions throughout the implementation. In the first occasion named Alternative Question-Posing Activity that took place before the implementation began, all students were given the same set of six questions and were asked to create new questions that are similar to the ones given to them. Similarity in this context has been explained to the students in pedagogical terms that they were assumed to be familiar with, such as Bloom's taxonomy of cognitive tasks. It was told that the new question they generated should be of similar complexity with the sample question they based it on. However, students were not explicitly instructed to include a story context in the students they generated in this manner, nor were they asked to try and generate a rather unique question. In contrast, the second occasion at the end of the implementation named Authentic Problem-Posing Assignment, involved the students work in pairs and attempt at posing a single problem that (a) is complex (b) has a story context – preferably based on real-life experiences. Students were also informed that their question should be unique.

Statistical tests were carried out and it was shown that the quality of educational problems posed in the Authentic Problem-Posing assignment by students, as measured by the Rubric, were significantly higher than all six types of questions created during the Alternative Question-Posing Activity. This could be due to the fact that the Rubric favored problems that had both a story context and unique a structure, both of which might have been hampered by the nature of the Alternative Question-Posing Activity. In contrast, these qualities were strictly required of students in the Authentic Problem Posing Assignment.

Lavy and Shriki (2007) display a study on the usage of "What If Not" scaffolding strategy for supporting the problem posing process by inspiring prospective mathematics teachers with sample problems, asking them to evaluate the schema and formulate a new problem by changing only certain parameters. These researchers conclude their research saying that the use of such a strategy may result in being attached to certain objects and forms in question generation and limiting creativity. It is important to mention at this point a study by Bonotto and Dal Santo (2014) that defines problem-posing as a form of creativity, which is by itself a highly-valuable yet elusive cognitive skill the mechanics of which is not fully understood. Therefore, although sample-problem scaffolding techniques such as the Alternative Question-Posing Activity shown in this study may initially help students pose problems and in doing so develop an awareness into the internal realm of problem-solving learning and an ability to tear down an educational problem into its components, it is natural for the problems generated in this manner to be of subpar educational value.

It is also worth noting that as far as posing new problems based on manipulating existing samples is concerned, although a statistical relationship has not been investigated, there seems to be a linear relationship between the cognitive requirement of the sample question (climbing up in Bloom's taxonomy from remembering/understanding to applying/analyzing) and the educational quality of the question posed by the student.

Student Satisfaction

Based on data from the initial questionnaire and the final interviews, it has been found that, most students have used the Platform with varying frequencies of visit and somehow interacted with peer-generated content.

Aside from reporting a few technical bugs, which have been alleviated throughout the implementation, students were generally pleased with the Platform and the problem-posing activities it involved. To quote a few such remarks:

> "… I think that (the website) is very nice. In fact, this website is frequently used in our current instructional technology oriented courses, as an example. All my classmates refer to this website as a good example, including it in their (presentations) as a best practice…"

> "… I thought that, in the future, when I start working as a computer science teacher (at K12), I can introduce this a website to children. It is not menacing at all, rather, it is quite friendly, highly usable…"

> "… I'd like to use this website for teaching children how to use Linux in the future. The design is great, the idea is great, the content is great. All that one has to do is design creative ways to integrate it into the course… "

In addition to reporting overall satisfaction, students adopted a utilitarian approach and expressed the ways they benefitted from using the Platform, indicating that it was useful as a reference material throughout the course and that the ability to launch Linux virtual machines on the fly was particularly handy for practice. However, one student reported that relying on this Platform throughout the course may prevent peers from ever installing an actual copy of the Linux operating system on their devices for personal use, which was indicated by several students to be a necessary experience to pose higher quality problems. Another way students found the Platform useful was in monitoring how their peers are doing in the course, by examining peer generated content.

Student Opinions on Problem-Posing Activities

Overall, students find problem-posing to be a valuable educational approach, referring to the way it fosters meta-cognitive skill development in their own words such as:

> "… I think that problem-posing is one of the most effective instructional methods. Because, especially if the student can associate the problem with his own life, this may turn into a great educational motivator that facilitates permanency in learning. That is when he discovers things: he discovers a problem and then discovers a solution for it. The instructor, then, only serves as a guiding counselor in solving the problem"

As such, there have also been numerous occasions of students reporting that they referred to real-life experiences in the Authentic Problem-Posing Assignment. An example could be:

Table 6. Categories and Subsequent Themes Discovered in the Semi-Structured Final Evaluation Interviews.

Student Satisfaction

(16) I like the Platform…
    (3) … and I'd like to use it even after the course has finished
    (5) … and I find it visually pleasant
    (4) … and I enjoyed using the personal Virtual Machine (VM) provided.

Perceived Benefits

(15) I benefitted from using the Platform …
    (11) … as a reference material for the course
    (10) … especially by using the VM
        (5) … since it's a better alternative to locally installing virtual machines myself.
    (5) … by observing how my peers are doing.

A Need for Sample Problems

(4) I based my problem on another problem posed by the instructor during the course
(3) It is beneficial for the course instructor to provide us with sample problems
(3) I felt I needed more sample problems during the course
(2) Future users of the Platform may make use the content we generated as samples to base their problems on.
(5) Structuring my posed problem based on an existing "problem posing template" was useful.

References to Real Life Problems

(12) I posed a problem based on my personal, real-life experiences …
    (8) … and I felt a personal involvement with the problem I posed
(4) In order to pose problems about it, students need to use Linux in their daily lives.

A Need for Social Interaction

(5) I checked content due to curiosity on how others have performed in tasks similar to mine
(5) A peer-rating system may be considered for evaluating the quality of user generated educational content.
(2) A space for public discussions outside of problem-posing activities, such as a forum section, may be needed.

A Difference between Problem Solving and Posing

(15) Problem posing is beneficial as an educational activity…
    (8) … because it leads to deep thought, fostering deeper/meaningful/permanent learning
    (4) … but students need to know the subject matter very well.
(6) I have never done this sort of activity before.
(6) Problem posing is a difficult task…
    (4) … because finding problems is hard.
    (3) … because it's easy to find a problem but not so easy to find its solution
(3) Problem-posing is an easy task…
    (5) … not having to find solutions to posed problems makes problem posing an easier task.
        (2) … but this reduces problem quality.

Qualities an Educational Problem should Possess

(3) Solving it should benefit others…
    (2) … educationally.
(5) A high quality educational problem is one that is difficult to solve

Miscellaneous Recommendations

(5) Weekly problem-posing assignments may be needed.
(6) Content may be reviewed by "editors" before being published
(9) The instructor should also generate content in the same way as students do.
(5) Site content should be sorted and/or grouped based on a sensible algorithm (based on alphabetical order, problem type, problem difficulty or rating score)
(3) The platform may be used by subject matter experts from the Industry, in addition to students.

> "... Back then, I was taking the Web-programming course too. We often had to transfer our program code to the hos device. That's when I encountered the problem (I posed). The other one I considered posing, was also about something I commonly experience: So I thought, sometimes I forget to bring my USB pen drive to the school. That's a huge problem for me, especially if I got a homework file in it."

At the beginning of the implementation and upon initial interactions with peer-generated content, some students have initially reported that they found some content to be low-quality, mostly based on peripheral features such as plagiarism and presentation format. At the end of the implementation however, student opinions on this matter had matured and they had begun expressing additional thoughts on what makes an educational problem worthwhile, reflecting the development of a meta-cognitive perspective on quality of educational problems. Examples include:

> "... I think; a good educational problem is one that I can ponder even after a long time has passed (upon hearing or solving it)."

> "... (In posing problems) I felt I had to somehow express myself clearly. Thus, I had to take special care in choosing the right language and remain understandable. I had to do this both in the problem text and the solution text..."

> *"... I thought, (my problem) should be something that can challenge students and lead them to conduct research. If the solution of my problem requires using 10 different commands, I thought, 8 of these should be things that the students know about while 2 should be things that he has to research on and discover by himself"*

Considering the references to problem complexity and structuredness in these responses, it is worth mentioning that these students had not undergone training on problem-solving learning and all the conclusions they drew were based on their own experience. While it is valuable for students to have developed awareness by themselves towards some of the elements that constitute a valuable educational problem, as put forth by Jonassen (2011), the question remains as to whether it would have bolstered this awareness to give the students an explicit yet short introduction to Jonassen's theories on problem solving learning.

The process that yielded this sort of change may have also led to students developing an awareness towards a clear distinction between problem-posing and problem-solving as cognitive activities. Students have reported many times that not necessarily having to come up with a solution for the problems they posed was making the task of problem posing much easier. Some, though, have reported that not having to formulate a solution when posing a problem may lead students to produce problems haphazardly, thus resulting in problems of lower educational value.

> *"... (As long as solution-posing is not mandatory) I think that, for most people, problem-posing activities may only mean 'fire-up a random question, then forget about who needs to solve it'"*

Others have expressed that they never undertook this sort of activity in their life and that finding problems in itself is a very difficult task, saying:

> *"... Other instructors give us problems and ask us to solve them. (In this course) We've had to create our own problem from scratch, sometimes even without needing to come up with a solution. In the beginning, I found this hard to get used to. It seemed quite different from what I've seen so far."*

> *"... It's hard. Finding a problem is hard. Especially one that is challenging enough for the student, one that is facilitating the permanent acquisition of knowledge. But yes, I think that it (problem solving) facilitates permanency in learning."*

> *"... I discovered how hard it is to be a teacher, to create exams for students to take. I've had considerable difficulty in finding a problem during the problem-posing assignment."*

Such remarks from participants were also encountered in a study by Shakurnia, Aslami and Bijanzadeh (2018), where a problem-posing group of students have been shown to have greater academic achievement in a course; albeit expressing an overall feeling of disregard and alienation towards the task.

Students also emphasized in different ways that in order to pose higher quality educational problems, one needs to be more knowledgeable about the subject matter at hand. This finding justifies the decision to make use of the Codecademy module as a homework in order to increase exposure and accelerate learning in the first two weeks of the program. However, ways to extend such an accelerated training to support problem-posing performance should perhaps be explored.

Student Recommendations on Design and Implementation
Students recommendations that can support the design and development efforts of the Platform for more efficiently facilitating the problem-posing process were broken down into a few major categories. The first category of recommendations indicated a demand for a larger quantity of high quality, authentic educational problem cases by subject-matter experts, such as the course instructor, for the students to take inspiration from or use as samples. It should be kept in mind that the instructor has shared such problem cases with students, as it can be inferred from their interview responses suggesting that they used these instructor-posed problems as samples. However, there were only three such problem cases shared with students (complete with their solutions) and the number may not have been enough. Also, the problem cases were shared with students over a file-sharing service and not over the Platform. Thus, students report that they need the instructor to actively partake in the content-generation efforts along with them.

Second category of recommendations reflects issues in content handling and feedback. Students reported that a

smart sorting and grouping system (as opposed to the current alphabetical order) for content needs to be implemented. Whereas some students recommended a peer-review and rating system for content to be in place, so that problems can be sorted based on their structural features, contexts or complexity; others have advised that content needs to be supervised by an expert editor, such as the course instructor, before it is published. Needless to say, both systems would serve to fulfill a vital role of providing feedback for student generated content, which was another feature deemed necessary by many students.

The third category of recommendations is based on the aspect of social interaction. Some students have frequently mentioned that it was important for them to monitor the progress of others using the Platform, whereas some students wished that there would be other people using the platform, specifically subject matter experts. In the end, although the Platform was designed to support real-time interaction between students with screen sharing and instant-messaging capabilities, such interaction between peers may not have taken place since a student was quoted saying:

> *"... The entire time, I felt like there is nobody else but me using the platform in a given moment..."*

A mechanism for facilitating real-time interaction between students, which might help them with the impression that they're not alone, could be designed and implemented to alleviate this effect.

CONCLUSION

This research is based on a design and development work in progress and showcases initial findings on a case where student problem-posing activities are observed over the use of a minimum viable product. Findings on student satisfaction levels hint that the instructional design and technical development progresses for the online learning environment are probably on the right track, albeit with many student recommendations to consider for improving the learning experience. An attempt at developing a scoring rubric for evaluating the educational value of student-posed problems within the context of a complex cognitive skill was made and its draft version has been shared with readers. Examining the findings using this tool, it can be concluded that sample-question scaffolding techniques are adequate for helping students come up with problems in the beginning, but student posed problems under explicit instructions to portray authentic, unique and personally relevant cases yield a significantly higher educational value. Students seem to develop a meta-cognitive understanding towards the nature of educational problems during the course of problem-posing activities. Nevertheless, there does not seem to be a correlation between academic achievement and quality of authentic educational problems posed by students, perhaps due to the claim that educational problem-posing may, above all, be heavily reliant on the mystic and elusive high-order cognitive skill of creativity.

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IMPACT OF CORONAVIRUS 2019 ON EDUCATIONAL INSTITUTIONS IN INDIA

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ABSTRACT:
Coronavirus Disease (COVID-19) is an infectious disease caused by new virus originated from China, which affected around 200 countries in the world. The World Health Organization (WHO) has declared COVID-19 as pandemic and most importantly the vaccine of which is not found till date. Since past few days had been very crucial for India too, like other affected countries. Almost all states in India are threatened due to the speedy spread of this dangerous disease which is life challenging. To prevent and eradicate the darkness caused by the COVID-19, the Government of India has taken number of preventive measures including the closure of all Educational institutions followed by one day nationwide Janta-curfew to combat virus and 21 days lockdown to curb the coronavirus, etc. Showing the great concern towards students, Teachers and other stakeholders many circulars/ notices/ letters have been issued by the relevant authoritative governing bodies like MHRD, UGC, CBSE, etc. On the other hand, the lockdown period has caused some severe issues also such as breakdown in regular lectures, postponement of exams, etc. which might cause the shortage of time during the next upcoming academic year. Focusing on the various issues, The study highlights the Impact of COVID-19 on educational institutions in India.
Keywords: COVID-19, World Health Organization, Pandemic disease, Educational Institutions

INTRODUCTION:

Coronavirus disease (COVID-19) is an infectious disease caused by a newly discovered coronavirus. The 2019–20 coronavirus pandemic is an ongoing pandemic of coronavirus disease 2019 (COVID-19), caused by severe acute respiratory syndrome corona virus2 (SARS-CoV-2). The outbreak was first identified in Wuhan, Hubei, China, in December 2019 (The first confirmed death was on 9th January 2020 in Wuhan), and was recognized as a pandemic by the World Health Organization (WHO) on 11th March 2020. WHO depicted countries to take immediate actions and scale up responses to treat, detect and reduce transmission to save people's lives. As of month March 2020, more than 7,50,000 cases of COVID- 19 have been reported in over 200 countries and territories, resulting in around 45,000 deaths and over 1,00,000 recoveries.

The Indian government has announced several preventive measures to minimize the entry and spread of the coronavirus in the country. Prime Minister Narendra Modi is continuously reviewing the country's preparedness in combating the COVID-19 pandemic in India while both the state and central governments continue to announce new measures and responses to deal with the current situation. COVID-19 outbreak has impacted many states in India where the top five states with the highest number of the suspected case are Maharashtra, Delhi, Kerala, Rajasthan and Uttarpradesh.

The closure of schools, colleges, and universities by the respective State governments was an urgent need of the current situation which prevailed in all over India. Indian Government has started taking preventive decisions on COVID-19 just after WHO recognized it as pandemic disease. For most of the Schools and colleges in Maharashtra, the Academic year almost gets over by March and April. Also, it is seen that many colleges and schools have almost completed their academic syllabus and they were to concentrate on scheduling their final exams. But due to the decisions taken by our Governments for closing down the educational institutions, the schools and Colleges all over India had announced for either cancellation or re-scheduling their Exams dates, Keeping in mind the measures taken for bringing down the pandemic. Considering this, the study is conducted to analyze the impact of COVID-19 on Educational institutions and related stakeholders.

LITREATURE REVIEW
How Covid-19 Spreads
Literature evidence shows that the source of the COVID-19 is from animals and recently the virus is spreading from humans to humans [ECDC, 2020]. Recently there are no reasonable facts to identify how easily viruses are transmitted from person to person. However, the virus transmitted through respiratory droplets that human beings sneeze, cough, or exhale.

The incubation period for COVID-19 (i.e. the time between exposure to the virus and onset of symptoms) is currently estimated at between 2 and 14 days. At this stage, we know that the virus can be transmitted when those infected show (flu-like) symptoms [WHO, 2020].

Is COVID-19 comparable to SARS or the seasonal flu?

The novel coronavirus detected in China is genetically closely related to the SARS-CoV-1 virus. SARS emerged at the end of 2002 in China, and it caused more than 8,000 cases in 33 countries over eight months. Around one in ten of the people who developed SARS died.

The current COVID-19 outbreak caused around 7,000 reported cases in China during the first month after initial reports (January 2020), with a further 80,000 cases reported globally during the second month (February 2020). Of these first 87,000 cases, about 3,000 died. The third month caused around   8, 00,000 cases globally with death count touched to 45,000. Cases are now being detected across the globe. See the situation updates for the latest available information [ECDC, 2020].

Symptoms of COVID-19

The recent evidence shows that the fundamental symptoms of the COVID-19 are where the virus can cause mild, flu-like symptoms such as fever, cough, difficulty breathing, pain in the muscles and tiredness [ECDC, 2020].

More serious cases develop severe pneumonia, acute respiratory distress syndrome, sepsis and septic shock that can lead to the death of the patient. People with existing chronic conditions seem to be more vulnerable to severe illness.

Facts about the Vaccine against the COVID-19

The development of vaccines takes time. Several pharmaceutical companies are working on vaccine candidates (different kinds of vaccines). It will, however, take months before any vaccine can be widely used as it needs to undergo extensive testing to determine its safety and efficacy [ECDC, 2020].

Pandemic Disease Swine Flu (H1N1)

The H1N1 virus first emerged in Mexico in April, 2009 and has since spread to many countries. Swine flu is a communicable respiratory disease caused by a subtype of influenza a virus called H1N1. Its first outbreak was reported in 2009 globally and soon it was declared a pandemic by the WHO. The virus killed 981 people in 2009 and 1,763 in 2010. The mortality decreased in 2011 to 75. It claimed 405 lives in 2012 and 699 lives in 2013. In 2014, a total of 218 people died from the H1N1 flu, India recorded 837 laboratory-confirmed cases in the year. More than 450 people died of swine flu in India when it first broke out in 2009. More than 13,000 people were infected with the virus. The states with the highest number of swine flu deaths in 2009 included Maharashtra, Karnataka, and Gujarat.

Literature evidence shows that the original source of the Covid-19 is from animals and recently the virus is spreading from human to human [ECDC, 2020].Recently there are no reasonable facts to identify how easily viruses are transmitted from person to person. However, the virus basically transmitted through respiratory droplets that human beings sneeze, cough, or exhale.
The incubation period for Covid-19 (i.e. the time between exposure to the virus and onset of symptoms) is currently estimated at between 2 and 14 days. At this stage, we know that the virus can be transmitted when those infected show (flu-like) symptoms [WHO, 2020].

OBJECTIVES OF THE STUDY:

1) To assess the effect of COVID-19 on education in India with special reference to Schools and Colleges.

2) To analyze the actions and decisions taken by the government for the safety of Educational Institutions and related stakeholders.

3) To suggest and make them aware of some safety measures needed and to be adhered to by stakeholders to prevent themselves from COVID-19.

METHODOLOGY OF THE STUDY

This study is aiming to investigate the impact of COVID-19 on educational institutions and related stakeholders in March 2020, when the government has taken early actions for the prevention of viruses among the community. The study is descriptive and analytical and the data has been collected from the various official websites, newspapers, E-news articles and discussion with Teachers. To analyze the actions and decisions of the government in regards to preventive measures, the data has been compiled from various authentic sources available for March 2020 which is used for the interpretation and conclusion.

LIMITATION OF THE STUDY:

1. The study concluded with the help of data which is collected from the available sources such as Government websites, Official websites, News and the decisions and actions taken for the prevention of pandemic by Relevant Institutional bodies like CBSE, UGC, MHRD, etc.

2. The study is done to analyze the cause and effect of COVID-19 on educational institutions within the boundary of India only.

ACTIONS AND DECISIONS OF GOVERNMENT AND RELEVANT INSTITUTIONAL BODIES:

Purpose/Subject of Letter/Notification/Circular	Date dd/mm/yyyy	Reference no.	Issuing Bodies	Official Website
1) Awareness regarding Corona virus disease	04/03/2020	D.O. No. 14-3/2020-Sch.3	DHE, MHRD	https://mhrd.gov.in
2) Creating Awareness about preventive interventions for reducing transmission of Novel Corona virus disease	04/03/2020	Circular No. Acad-16/2020	CBSE	http://cbseacademic.nic.in
3) Advisory for Universities and Colleges- Novel Corona virus (COVID-19)	05/03/2020	D.O.No. F.No.1-14/2020(website)	UGC	https://www.ugc.ac.in/
4)Press Release- Exam Postponement and Other Institutional Related Works	18/03/2020	Press Release	CBSE	http://cbse.nic.in
5) Precautions to be taken in light of Novel Corona virus (COVID-19)	18/03/2020	No.Secy(HE)/MHRD/2020	DHE, MHRD	https://mhrd.gov.in
6) Notification no. 11/2020(Precautions to be taken)	19/03/2020	F.4.4/2020/NIOS/Eval/RC/	NIOS	http://www.nios.ac.in
7) Precautions to be taken in light of Novel Corona virus(COVID-19)	19/03/2020	F.No.110350/01/2020-KVS (HQ)/Acad/	KVS	www.kvsangathan.nic.in
8) COVID-19: STAY SAFE Digital Learning Initiatives of Ministry of HRD	20/03/2020	D.O.No.Secy(HE)/MHRD/2020	DHE, MHRD	https://mhrd.gov.in
9) Preventive measures to achieve "social distancing" - permission to teaching and non-teaching staff to work from home	21/03/2020	D.O.No.Secy(HE)/MHRD/2020	DHE, MHRD	https://mhrd.gov.in

10) Lockdown imposed for 21days with effect from 25/03/2020.	24/03/2020	No. 40-3/2020-DM-I(A)	MHA, GOI	https://www.mha.gov.in
11)Making the Quarantine Productive	25/03/2020	Circular No. Acad-20/2020	CBSE	http://cbseacademic.nic.in
12)Safety and Care of hotel residents	27/03/2020	F.No.1-1/2020(Secy)	UGC	https://www.ugc.ac.in

Table 1: Measures taken by relevant governing bodies to stop the outbreak of COVID-19

About the letters/notifications/circulars cited in Table 1, the following implications of such are summarized to study the actions and decisions taken by relevant authorities to take care of their stakeholders to stop the spread of the coronavirus among them.

Regarding **1st and 2nd** cited letter (Table 1), wherein it has been stated by Department of Higher Education(DHE) under Ministry of Human Resource Development (MHRD) thereafter Central Board of Secondary Education (CBSE) and other State Boards that "creating awareness among students, preventive interventions such as frequent hand washing, respiratory etiquettes (using handkerchief over mouth while coughing / sneezing, use of tissue paper or using the sleeve of shirt covering the upper arm, staying away from school when sick, avoiding public gatherings, etc.) would help in preventing/reducing transmission of not only this diseases but also a large number of another communicable disease, notably flu-like illnesses. Because, such informed youth can be agents of changes for their family, community and beyond."

Concerning **3rd** cited letter (Table1), wherein it has been stated by University Grants Commission (UGC) that "avoid large gathering, wearing of the mask if any symptoms related to Coronavirus, use of alcohol-based sanitizer or soap in restrooms, 14days home quarantine to students/teachers who have traveled history to any of COVID-19 affected countries, contact the helpline number if found any symptoms of coronavirus (fever, coughing, difficulty in breathing, etc.), avoid the use of biometric-based attendance, and so on. "These are the guidelines issued by UGC which depict that these measures were taken by the institution for taking care of their students, teachers and other stakeholders".

Regarding the **4th** cited letter (Table1), wherein it has been stated by CBSE that "all ongoing and upcoming examinations of the board for classes-X and XII will be rescheduled after 31st March 2020. "This clearly shows that the early decisions were taken by the Educational Institution for the prevention of stakeholders to break the speedy spread of COVID-19 among them."

Regarding **5th, 6th and 7th** cited letter (Table1), wherein it has been stated by DHE under MHRD thereafter CBSE and National Institute of Open Schooling (NIOS) that "CBSE has already issued the guidelines to rescheduling of exams after 31st March 2020 but Universities, Colleges, NIOS, and other entrance or competitive exams may schedule by them after 31st March 2020." This decision is taken by the Ministry of Human Resource Department and other relevant bodies that are implemented from time to time wherein they decided to postpone all exams and other related work to prevent the spread of COVID-19 and took these measures for the safety of their stakeholders."

About **8th** cited letter (Table1), wherein it has been stated by DHE under MHRD that "Institutions shall promote the digital learning among students so that they can continue their learning by making full use of available digital/e-learning platforms i.e. for School Education-DIKSHA, E-Pathshala, National Repository of Open Educational Resources (NROER) and for Higher Education- SWAYAM, SWAYAM PRABHA. The suggestions were also made that access to these resources should be made available free of cost." This particular initiative is provided by the Government of India to all the students in lockdown period so that they can take the advantage of the ample of time which is available to them and E-learning boosts and saves their energy as they learn new things in new ways in their own pace and comforts of their Homes."

About **9th** cited letter (Table1), wherein it has been stated by DHE under MHRD that "Faculty members/Teachers/Researchers utilize their time for the development of online content, teaching and learning, evaluation, preparation of lesson plan, carry on research, write articles, papers, preparation of innovative Question Bank, etc. All faculties/Teaching staff/Non-teaching staff shall be counted as being on duty." These initiatives by the Government have provided relief to the staff of educational Institutions to WORK FROM HOME and utilize their valuable time in developing the required skills and bring out their best to the society even during the tough times."

About **10th** cited letter (Table1), wherein it has been stated by Ministry of Home Affairs (MHA) under Government of India (GOI) that "Whereas the National Disaster Management Authority (NDMA), is satisfied that the country is threatened with the spread of COVID-19 epidemic the PM Modi has announced 21days lockdown in the country to stop the spread of coronavirus." This decision is taken by the Government which was made to prevent the society from the speedy spread of Coronavirus. But it is found that this decision made many Teachers, Students, etc unhappy because the exams and other related administrative work are now postponed due to the 21 days lockdown policy.

About **11th** cited letter (Table1), wherein it has been stated by CBSE that "Teachers can make quarantine time productive by (1)Planning for the whole session/Year by preparation/writing of Learning Outcomes (LOs), mapping Learning Outcomes (LOs) to Curriculum, developing E-contents, etc (2) Performing Students Enrichment Activities by tutorials/video lectures, designing online formative assessment & self-assessment, etc. And (3) Performing Teacher Enrichment Activities by updating themselves with reading books, using online training platforms like SWAYAM, and writing blogs, etc. "These measures suggested by CBSE to all the Teachers which will help them to focus on their professional development thereby enhancing their skills and make the best and productive use of time."

Concerning last i.e. **12th** cited letter (Table1), wherein it has been stated by UGC that "The students who are residing in hostel are the responsibility of the team members (wardens, deans, other officials, and other staffs). So it was directed to work together for the welfare of one and all by taking due care of students through team members covering all aspects from health care, safety, accommodation, food and hygiene." This decision was really helpful to all those hostel students who are far away from their homes, families and relatives, to feel safe and secure in their respective Hostels and not to consider themselves as neglected ones."

"Overall every institutional body, State and Central Government in coordination with each other have taken decisions to prevent their stakeholders from this pandemic, without much concerning about the long delay in institutional work and this loyal step shows the priority is given to the health of their employees, stakeholders, etc than any other work."

SOCIAL DISTANCING:

Social distancing measures are steps one can take to reduce social interaction between people. This will help reduce the transmission of COVID-19.

They are to:

1. Avoid contact with someone who is displaying symptoms of the coronavirus (COVID-19). These symptoms include high temperature and/or new and continuous cough.
2. Avoid non-essential use of public transport when possible.
3. Work from home, where possible. Employers should support the employees to do this.
4. Avoid large and small gatherings in public spaces, noting that pubs, restaurants, leisure centers, and similar venues are currently shut as infections spread easily in closed spaces where people gather together.
5. Avoid gatherings with friends and family. Keep in touch using remote technology such as phone, internet, and social media.
6. Use telephone or online services to contact with others to avoid personal interaction.

SUGGESTIONS:

1) Educational Institutions must adopt different ways to make students aware about these pandemic diseases like Swine Flu, COVID-19, etc. through Seminars, conferences, Special lectures on awareness, etc. so that, they know the basic things to be taken care of while dealing with such disastrous situations in future.

2) To date there has been no Antivirus to kill this disease except the Social Distancing to avoid the spread of COVID-19. So, keeping a distance and being at home, as suggested by our governments, is the only cure for such pandemic diseases.

3) The awareness must be created for preventives interventions such as the use of sanitizer for cleaning hands, use of mask, avoid handshake, using handkerchief over mouth while coughing/sneezing and follow other guidelines given by the relevant authority, which will help in reducing the transmission of disease from one person to another.

CONCLUSION:

A problem of COVID-19 started from Wuhan city of China affected around 200 countries in the world including India. Because of COVID-19 there was lockdown imposed in almost each affected country to prevent their residents as the situation needs social distancing to stop the spread of the virus among residents.

In India, the various Institutional bodies and Governments have taken timely decisions to prevent their stakeholders from the spread of pandemic disease COVID-19. Schools and Colleges closed down by the relevant governing bodies and Government till the time situation comes under control. There is a huge threat of spreading the disease caused by the Coronavirus among the stakeholders, students, teachers and others as they come in direct contact with many known and unknown people. It is also seen that the disease can be easily spread just by coming in contact with a carrier of such disease. While traveling, visiting malls/restaurants, playgrounds, attending lectures in schools or colleges, buying products, and more, the Students, Teachers and other stakeholders can easily be caught by the virus. This is the main reason that our Government has asked for observing Quarantine and to adhere to the rules stated to prevent the society/ country from being affected by such dreadful disease. The early actions of closing down all the Educational Institutions was indeed a good decision for the welfare of their people, but it is also noted that the examinations which are postponed may affect the student's final performance as there is now a long gap between the lessons taught to them in the class and their final exams. They may not score that good because of the long delay. Also, we may suffer a shortage of time in the next upcoming academic year. Such problems can be solved, if Teachers show a little concern about their students and provide them with online revision lectures to keep them in touch with the syllabus covered maybe a month ago. Also, students need to actively participate in those online lectures and practice the same in their spare time. And last but not least, we all must observe the rules and regulations stated by our Government to prevent our Nation from the spread of the Coronavirus.

 Overall, As per the need of the situation, the Indian government in cooperation with state government and relevant institutional bodies have taken right and appropriate decisions to close down institutions for the welfare of the stakeholders and society.

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QUALITY ASSURANCE IN DISTANCE EDUCATION: AN ISSUE NEEDS TO BE RESOLVED ON PRIORITY BASES IN PAKISTAN

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ABSTRACT:
This research study investigates the role of distance education in a substantial development in Pakistan, its strengths, weaknesses, and responsibilities of accreditation bodies working under the umbrella of HEC Pakistan in maintaining, or improving their standards of education to meet future challenges. For the purpose, the institutes offering distance education were explored and their selected curricula for different levels and procedures were analyzed through the opinions of the students, tutors, course coordinators, and heads. Mixed methods research strategy was adopted to achieve the desired results tailor-made questionnaires were used to collect data from the heads of the institutes, course supervisors, tutors and students getting education through distance learning programs. The findings show that the selected curricula by the institutes offering distance education are not up to the mark moreover their ways of assessment need improvement. On the bases of findings, it is recommended that distance education institutes need to improve their procedure to assure quality education. Further, it is recommended that the government of Pakistan should plan to promote better and quality distance education by establishing more distance education institutes.

INTRODUCTION

As the world is changed in a global village, therefore the importance of education in Pakistan is increasing day by day, because it is a social instrument through which man can guide his destiny and shape his future. An uneducated man can't become a part of development. Education is necessary for the social and economic development of a nation. But Wafa (2015) writes in his comments written to Daily Times that the illiteracy rate in Pakistan is increasing day by day and the figures have reached millions. He further says that education is the right of every child whether rich or poor and if the right of education is taken away from children, how will Pakistan make progress? The government and NGOs should make concrete efforts to spread education in underdeveloped areas of Pakistan. In the present era of technology, there are many ways for spreading education in remote areas i.e. the blogosphere, books, podcasts, and online videos. As the majority of people in Pakistan are poor, having no access to such advance technologies or maybe the elders in the families having a misconception about those technologies could be used to promote education in Pakistan. As it is difficult for the government to open new educational institutes to fulfill the educational needs of the people living in remote areas, there are several areas in Pakistan where parents do not send their children especially girls to schools/colleges, in such circumstances institutes providing distance education can play their role in promoting education in Pakistan. Distance education has become a major topic of interest in the field of educational communications and technology. According to Simonson (2006) distance education is defined as institution-based formal education where the learning groups are separated and where interactive telecommunications systems are used to connect learners, resources, and instructors. Margaret (2005) says, distance education sometimes called e-learning, is a formalized teaching and learning system specially designed to be carried out remotely by using electronic communication. Because distance education is less expensive to support and is not constrained by geographic considerations if offers opportunities in situations where traditional education has difficulty. Grenberg (1998) defines contemporary distance education as "a planned teaching/learning experience that uses a wide spectrum of technologies to reach learners at a distance and is designed to encourage learner interaction certification of learning" (p.36). Teaster and Blieszner (1999) say "the term distance education has been applied to many instructional methods: however, its primary distinction is that the teacher and learners are separate in space and possibly time" (p.741). Desmond Keegan (1995) provides another definition, he states that distance education and training result from the technological result from the separation of teacher and learner

which frees the student from the necessity of traveling to a fixed place, at a fixed time, to meet a fixed person, to be trained. From these definitions, we can see that the student and teacher are separated by space, but not necessarily by time. A few years ago, online education was unthinkable; now it is a reality and it has expanded beyond imagination. The internet has allowed us to cross boundaries that took a long time to cross; technology has allowed us to learn and grow with people from around the world. It has given access to new opportunities in work, learning and in socializing. We are now witnessing a transformation in the way people learn. The future of education in general and college education, in particular, will be of more access, more educational choices, and new fields in education research.

Distance education has been used for formal as well as professional education, it has also been used to teach, support and develop teachers for many years, while the success of programs has varied, experience demonstrates that distance education can be used to enable teachers to learn and to gain qualifications. The use of new information and communication technologies has drawn new attention to open and distance learning and offers new possibilities. Saide and Saide (2003) have defined distance education as an educational process in which a significant proportion of the teaching is conducted by someone removed in space and/or time from the learner. Open learning, in turn, is an organized educational activity, based on the use of teaching materials, in which constraints on the study are minimized in terms either of access, or of time and place, peace, method of study, or any combination of these. In the context of teacher education, we have found it useful to understand distance education not as a mode of delivery with one identity, but rather as a collection of methods for the provision of structured learning in situations where students are unable primarily to attend fixed classes at a centralized venue and physical presence of a teacher.

The institutes providing distance education in Pakistan are Aga Khan University, Allama Iqbal Open University, Bahauddin Zakariya University Multan, Commonwealth Distance Learning Scholarships for Pakistani and Developing Countries, COMSATS IIT, Virtual Campus, Gomal University Dera Ismail Khan, Government College University, Faisalabad, Islamia University Bahawalpur, Sarhad University of Science and Information Technology, University of Engineering and Technology Lahore, University of Peshawar, University of Sindh, Preston University, and the Virtual University of Pakistan.

STATEMENT OF THE PROBLEM
In Pakistan, the institutes providing distance education enroll the students, send them the related material i.e. books, assignments, and tutors names, etc., the students are provided opportunity to meet the tutors fortnightly, the tutors are supposed to solve the queries or give instructions to the students, the students are supposed to complete the assignments within a fixed time and at the end of the semester, the institutes conduct a comprehensive examination. Usually, it is observed that students do not attend the meeting/classes, just finish and submit the assignments, appear in final exams, get the certificate or degree but when they hunt for the job then find it difficult to have a good job, because the question on quality of process and transparency is always raised by the educators of formal education institutes and administrators of institutes having the mandate of recruitment of quality employees.

PURPOSE OF THE STUDY
The purpose of this research study was to measure the quality of education provided by distance education institutes working in Pakistan as this system caters to a large number of populations with several programs in Pakistan. This system is providing lifelong learning opportunities to those who for any reason cannot attend regular study programs like females at home, working people, and people living in remote areas having social, financial as well as cultural barriers but are willing to enhance their knowledge and skills.

RESEARCH QUESTIONS
Following questions were raised to achieve the purpose:
- Are the students satisfied by the knowledge, and the medium used to impart it?
- Do the students get a high-status job after completing their education from distance education institutes?
- Are the heads/coordinators/tutors satisfied by the students' attitudes towards their studies?
- Do the programs offer by such institutes meet international standards?
- Do the heads check the effectiveness of their programs offered by their institutes?
- Do they wish to get the offered programs evaluated by external bodies?

RESEARCH METHODOLOGY

The mixed approach was used during this research study both qualitative and quantitative methods were used to analyze the collected data. The research was based on a descriptive study because it describes the effectiveness of distance education programs offered by distance education institutes.

The population of the study was students, tutors, course coordinators, administrators (Employees recruiting bodies) and the head/s of the institutes offering distance education programs. There are (13) thirteen institutes in Pakistan offering distance education programs, there are only two (2) institutes having their campus in Karachi or working in Karachi, therefore the data was collected by using five tailor-made questionnaires to get the answers from the target population.

Sample and Data Collection Procedure

By using a stratified random sampling procedure, the data was collected in five phases:

Phase-I

In this phase, data were collected from one hundred (100) B.Ed. and M.Ed. students 50 each including males and females completing their education using distance education mode, a questionnaire consisting of five closed-ended and one open-ended question was used. The ratio of the participants is shown in the table and graph below:

S. No.	Course	Gender	No of Participants	Total	%age
1.	B.Ed.	Males	16	50	32%
2.		Females	34		68%
3.	M.Ed.	Males	11	48	22.91%
4.		Females	37		77.08)
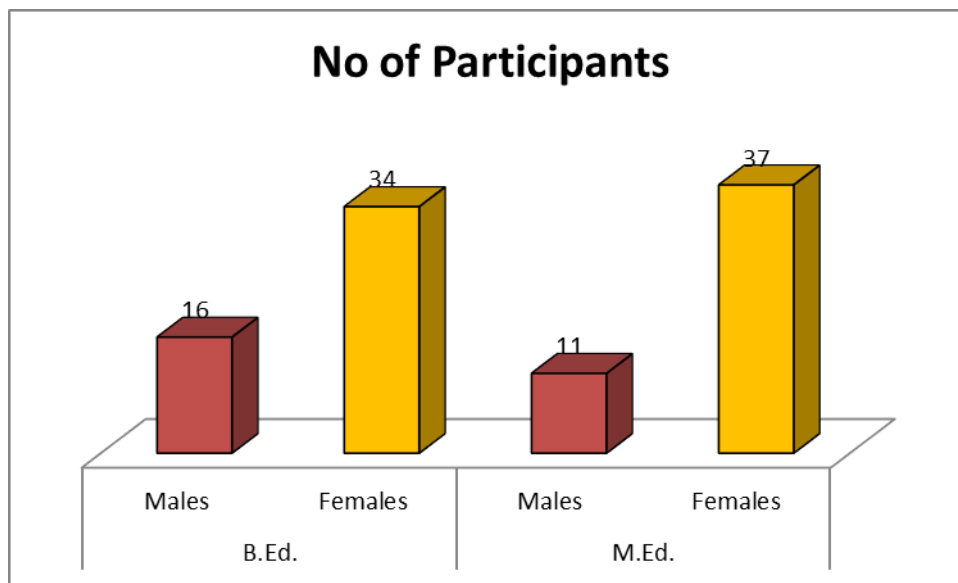
Phase-II

In this phase, data were collected from the administrators or bodies involved in teachers' recruitment, a questionnaire consisting of three close-ended and two open-ended questions. The questionnaire served to forty-eight (48) heads of both public, private, primary, secondary, and higher secondary institutes, the details of respondents is shown in the table and graph given below:

S. No.	Category	Level	Gender	No of Respondents	Total	%age
1.	Public	Primary	Males	03	08	37.5%
2.			Females	05		62.5%
3.		Secondary	Males	04	08	50%
4.			Females	04		50%
5.		H. Secondary	Males	04	08	50%
6.			Females	04		50%

7.	Private	Primary	Males	00	08	0%
8.			Females	08		100%
9.		Secondary	Males	04	08	50%
10			Females	04		50%
		H. Secondary	Males	04	08	50%
			Females	04		50%

Phase-III

In this phase data was collected from the tutors, imparting distance education, using a questionnaire consisting of eight closed-ended and one open-ended questions. The questionnaire was served to fifty (50) tutors including males and females taking B.Ed. or M.Ed. or both levels classes. The detail of respondents is as under:

S. No.	Gender	Level	No. of Respondents	Total	%age
1.	Males	B.Ed.	13	25	52%
2.		M.Ed.	05		20%
3.		Both	08		32%
4.	Females	B.Ed.	15	25	60%
5.		M.Ed.	04		16%
6.		Both	06		24%

Phase-IV

In this phase, data were collected from the course coordinators. Who works as a bridge between the students and the tutors, using a questionnaire consisting of five closed-ended questions. The questionnaire was served to four (04) course coordinators, coordinating B.Ed. and M.Ed. or both the courses. The detail is as under:

S. No.	Gender	Course	No. of Participants	Total	%age
1.	Males	B.Ed.	02	04	50%
2.		M.Ed.	02		50%
3.	Females	B.Ed.	00	00	0%
4.		M.Ed.	00		0%

Phase-V

In this phase data was collected from head/s of the institute conducting distance education programs, using a questionnaire consisting of five closed-ended questions to measure their level of satisfaction about the programs offered by them and their consent about the evaluation of programs by external evaluators. The designed questionnaire was served to 02 (two) heads one each institute, one was male while the other was female.

DATA ANALYSIS

The collected data were analyzed by using a simple percentage formula, and the item-wise analyses of all questions asked from heads/administrators/coordinators/tutors/students are as under:

1. **Students Responses**
   a. In response to the first asked question (How do you get your assignments?), the students responded that they get their assignment through postal services and sometimes they are also sent messages by using short message service.
   b. In response to the second question-related completion of tasks given (How do you complete your assignments?) the responses of the students are as under:

S. No.	Response	Total	%age
1.	Tutor Assistance	12	12.24%
2.	Self-Study	78	79.59%
3.	Both	08	8.16%

   c. In response to the third asked question which was about the students' level of satisfaction (Are you satisfied by the knowledge you gain through this system?), the responses of the students are as under:

S. No.	Response	Total	%age

1.	Yes	07	7.14%
2.	No	03	3.06%
3.	Sometimes	88	89.79%

d. In response to the forth asked question in which they were asked to give some suitable suggestions for improvement and majority of the students shared/proposed that modern technology should be used for teachers' and students' interaction for a better understanding of the subject.

e. In response to the fifth asked question which was about the utility of knowledge gained in practical life. The responses are as under:

S. No.	Response	Total	%age
1.	Strongly Agreed	18	18.36%
2.	Agreed	25	25.51%
3.	No Comments	58	59.80%
4.	Disagreed	00	0%
5.	Strongly Disagreed	00	0%

f. In response to the last asked question, this was about their level of confidence in getting a suitable, good or highly paid job after completing a distance education program. The responses of the participants are as under:

S. No.	Response	Total	%age
1.	Strongly Agreed	7	%
2.	Agreed	12	%
3.	No Comments	57	%
4.	Disagreed	13	%
5.	Strongly Disagreed	9	%

2. Administrators or Recruiting Authorities Responses

a. The responses of the participants about the first asked question, which was about the selection criteria of teachers, their responses are as under:

S. No.	Response	Total	%age
1.	Knowledge	32	66.66%
2.	Degree Awarding Institute	7	14.58%
3.	Both	9	18.75%

b. In response to the second asked a question that does the candidates having degree through distance education program meet the standards fixed by your institute, the responses of both public and private institutes heads are as under:

S. No.	Response	Total	%age
1.	Yes	2	4%
2.	No	37	77.08%
3.	Sometimes	9	18.75%

c. In response to the third asked question which was about the reason that candidate having degree through distance education do not meet the standards set by the institute, majority of them argued that as they do not attend regular classes, having any chance of interaction with a teacher, as a result, their comprehension, retention, and implication of knowledge is weak or sometimes equal to none.

d. In response to the forth asked question, it was concluded from their responses that modern technology should be used teacher-students interaction.

e. In response to the fifth asked question which was about the presence of employees having degrees through distance learning programs, their responses are as under:

S. No.	Response	Total	%age
1.	None	29	60.41%
2.	Few	18	37.5%
3.	Many	1	2.08%

3.   Tutors Responses

a.   In response to the first asked question, which was about the tutors' interaction with the students, their responses are as under:

S. No.	Response	Total	%age
1.	Yes	2	4%
2.	No	17	34%
3.	Sometimes	31	62%

b.   In response to the second question related to their satisfaction towards the performance of the students their responses are as under:

S. No.	Response	Total	%age
1.	Yes	9	18%
2.	No	23	46%
3.	Sometimes	18	36%

c.   In response to the third asked question which was about the relation between the knowledge gained through a distance education program and good or highly paid job for the students. The responses of the teachers are as under:

S. No.	Response	Total	%age
1.	Strongly Agreed	2	4%
2.	Agreed	5	10%
3.	No Comments	33	66%
4.	Disagreed	7	14%
5.	Strongly Disagreed	3	6%

d.   In response to the fourth question, which was about the curriculum of distance education institutes and need of the modern world of technology, the responses of the tutors are as under:

S. No.	Response	Total	%age
1.	Strongly Agreed	1	2%
2.	Agreed	7	14%
3.	No Comments	38	76%
4.	Disagreed	3	6%
5.	Strongly Disagreed	1	2%

e.   In response to the fifth asked question, which was about the knowledge gained through distance education and its utility in practical life by the students, the responses of the participant's tutors are as under:

S. No.	Response	Total	%age
1.	Strongly Agreed	30	60%
2.	Agreed	14	28%
3.	No Comments	2	4%
4.	Disagreed	3	6%
5.	Strongly Disagreed	1	2%

f.   In response to the sixth asked question, which was about their satisfaction while working with distance education institutes, the responses are as under:

S. No.	Response	Total	%age
1.	Yes	11	22%
2.	No	15	30%
3.	Sometimes	24	48%

g. In response to the seventh asked question, which was related to the incentive given to them and their satisfaction, the responses are as under:

S. No.	Response	Total	%age
1.	Yes	1	2%
2.	No	45	90%
3.	Sometimes	4	8%

h. In response to the eighth asked question which was about the changes needed in aspects of distance education i.e. programs offered, the medium of students-teachers interaction, or submission of assignments, the responses are as under:

S. No.	Response	Total	%age
1.	Programs offered	3	6%
2.	The medium of students-teachers interaction	11	22%
3.	Mode of submission of assignments	13	26%
4.	All of the above	23	46%

i. In response to the ninth asked question, it was an open-ended question asking suggestions for improvement in distance education programs offered by the institutes in Pakistan. The responses of the tutors were tagged as up-gradation of incentives, the medium of communication, overall they suggested bringing change in the distance education programs of Pakistan institutes and to align them with the modern world.

4. **Coordinators Responses**

04 coordinators 02 from each institute were elected to get their consents about the programs offered by them, the detail of the responses are as under:

a. In response to the first asked question which was about their expectation from the students, their responses are as under:

S. No.	Response	Total	%age
1.	Yes	1	25%
2.	No	0	0%
3.	Sometimes	3	75%

b. In response to the second asked question which was about the students' satisfaction from the services provided by them, the responses are as under:

S. No.	Response	Total	%age
1.	Yes	1	25%
2.	No	0	0%
3.	Sometimes	3	75%

c. In response to the third asked question related to students success in getting good or highly paid job in the market, their responses are as under:

S. No.	Response	Total	%age
1.	Yes	2	50%
2.	No	0	0%
3.	Sometimes	2	50%

d. In response to the forth asked question which was related to their satisfaction for services provided by their institute, their responses are as under:

S. No.	Response	Total	%age
1.	Yes	2	50%
2.	No	0	0%
3.	Sometimes	2	50%

e. In response to the fifth or the last question, its purpose was to get their consent about the areas of their institutes needs improvement, their responses are as under:

S. No.	Response	Total	%age
1.	Selected Contents	0	0%
2.	Teacher-students interaction	1	25%
3.	Assignments procedure	1	25%
4.	All of the above	2	50%

5. Responses of Heads of the Institutes Offering Distance Education

To get the consents of the regional heads of the institutes offering distance education programs semi-structured interviews were conducted, their responses are as under:

a. The first question was about their satisfaction related to services provided by their institutes, the responses are as under:

S. No.	Response	Total	%age
1.	Yes	1	50%
2.	No	0	0%
3.	Sometimes	1	50%

b. In response to the second asked question related to the up-gradation of the curriculum, the responses are as under:

S. No.	Response	Total	%age
1.	After one year	0	12%
2.	After five years	0	22%
3.	When needed	2	24%
4.	None of the above	0	42%

c. In response to the third asked question which was about evaluation to measure the effectiveness of the programs offered by them, the responses are as under:

S. No.	Response	Total	%age
1.	Internal Body	0	0%
2.	External Body	0	0%
3.	None of the above	2	100%

d. In response to the forth asked question which was to get their opinion for programs evaluation by the external body, their responses are as under:

S. No.	Response	Total	%age
1.	Yes	0	0%
2.	No	0	0%
3.	May be	2	100%

e. In response to the last or fifth asked question, which was related to the standard of the programs offered by their institute in relation with the international standards used for distance education, the responses are as under:

S. No.	Response	Total	%age
1.	Yes	0	0%
2.	No	0	0%
3.	May be	2	100%

DISCUSSION

The collected data indicates that

a. The students get their assignments through postal services which are unreliable and costly, they finish the assignments by themselves (79.59%), and are sometimes (89.79%) get satisfaction. They wish that modern technology should be involved in distance education programs offered in Pakistan. The majority (59.80%) of students were having no response to the utility of knowledge in their practical life, moreover, most of the students were not confident that they will get a good or highly paid job after completing the program through distance education.

b. The recruiting authorities consider the knowledge (66.66%) of the candidate, not the degree awarding institutes, but they (77.08%) said that those who finish their education through distance education do not meet the standards required by their institutes in case of knowledge or confidence in performing the tasks assigned, in this regard they argued that as they do not attend regular classes, having no chance of interaction with a teacher, as a result, their comprehension, retention, and implication of knowledge is weak or sometimes equal to none, further they proposed that distance education institutes could modern technology for that purpose. It is also disclosed that they (60.41%) do not employees having a degree through the distance education program.

c. The tutors said that they (62%) do not have frequent interaction with the students, they (46%) are not satisfied by the performance of the students, they (66%) gave no comments when they were asked that will the students get highly paid jobs and in case of curriculum and needs of the modern world of technology 76% were having no comments. They (60%) said selected contents are useful if students study it seriously, the tutors (78%) are not highly satisfied by their job with distance education institutes because 90% are not satisfied by the incentive they are given, they (46%) suggested overall improvement in the distance education programs and asked for use of modern technology.

d. The course coordinators (75%) feel that students sometimes perform as per their expectations, they (75%) disclosed that sometimes they find students being satisfied by the services provided by their institute, they were having a fifty-50 ratio in case of students succeed in getting a well-paid job, moreover, they all suggested for improvement.

e. Regional heads of the institutes sometimes get satisfaction provided by their institute, they (24%) revise curriculum when needed while (42%) chose no option, 100% having no external or internal body for evaluation of the programs offered, they (100%) feel maybe there should be some external body for evaluation of the program as they (100%) are not sure that the programs offered by them meet the international standards.

CONCLUSIONS

From the collected responses from the respondents and views of scholars, it is concluded that

- The students neither satisfied by the process and nor confident that after finishing their education they will get highly paid jobs.
- The tutors and coordinators themselves are not satisfied by the students' attitude towards the tasks assigned and ultimately the knowledge gain by them.
- The recruiting authorities feel that the candidates having degrees through distance education programs cannot compete with candidates having degrees through the regular formal education system in case of knowledge and confidence.
- The heads of the institute neither get their programs up-dated on regular bases nor get them evaluated from internal/external evaluators, moreover, they do not get feedback from students or the market to bring changes in the programs as per changing time.
- Overall it is concluded that the question raised by other institutes providing formal and heads having the mandate of recruiting quality employees is true.

Recommendations

On the bases of findings, it is recommended that as the demand of distance education is increasing day by day and to upturn the effectiveness of the programs offered and to bring their standards to international levels, the institutes offering distance education should

a. up-date their curriculum on regular intervals

b. should get regular feedback from end-users i.e. students, tutors, recruiting authorities to measure the effectiveness of the procedure and the programs

c. should get the programs to be evaluated by some external neutrals evaluators
d. keeping in view the requirements of the present-day market, the accrediting body needs to play an active role.

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