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Table Of Contents

COMMON WRITING CHALLENGES OF THE UNDERGRADUATE STUDENTS: A CASE STUDY

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ABTRACT:
The study explores the common writing challenges of undergraduate students at tertiary level. The study was qualitative in approach. Data were collected from the composition writing of the students of first and second semester of five departments, i.e. CSE, EEE, English, Law and Business departments at a private university in Dhaka, Bangladesh. Forty students were selected and among them, twenty students were taken from the first semester and the rest twenty from the first semester. Data were also collected from the teachers' interview along with observation and in this connection, four ELT teachers were interviewed individually. The major findings showed that the challenges in verb, capitalization, number, passive mood, the use of gerund and infinitive, sentence arrangement, article, pronoun and spelling mistakes were common in students' writing. However, the study sought the causes of these drawbacks of the undergraduate students and explored some remedies at the end of the study.
Key Word: Common writing challenges; undergraduate students; Nonnative English learners;

1. INTRODUCTION:

Writing is very tough and crucial for the second language learners and even native speakers sometimes fail to write standard writing (Kukurs, 2012). Errors affect the writing of the L2 learners badly. Before the seventies, errors were considered as the weakness of language learning. After that, the introduction of Corder's theory of error analysis brought a revolutionary change in this field and till then, making errors have been contributing to achieving the maximum output through the use of error analysis theory. However, lack of the proper guidance of the English teachers and the demotivated attitudes of the learners have made the thing harder to be solved (Stern, 1983, cited in Ireen Sayeed, 2016). No doubt, there is a difference between errors and mistakes. The study focuses on the types of challenges, L2 learners encounter in their writing. In the context of Bangladesh, students learn English for almost 12 to 14 years and by the period of learning, they learn every aspect of English language. But the fact is that students make a list of common mistakes despite having sound theory-based grammar knowledge and they have the ability to identify these mistakes if they are conscious enough to do this. Corder (1967) opined that it seems not surprising when L2 learners face challenges in their writing because their first language has a great influence on learning second language and thus while writing in the second language , there occur mistakes .

English has been one of the major courses taught from class one to class 12 and at the university level, learners are scheduled to study English compulsorily in the first and second semester. As mistakes are easy to be corrected by the learners themselves and so, this study explores a number of common challenges of the tertiary learners in their writings and shows the reasons of such committing. Besides, it tries to provide the possible remedies which are frequently found in the learners' writings.

2. RATIONAL OF THE STUDY:

Writing is always laborious and challenging and it poses a number of problems for the learners (Langan, 1987) & Gunning (1998). It is accepted as a common conception that the problems of L2 learners are enormous in writing and even the native learners in most cases never master in writing (Nunan 1999). So, it would not be surprising when second language learners encounter difficulties in terms of acquiring writing skill. The present study explores common tendency of the tertiary students in their writing which will make the concerned alert and help make some initiatives in reducing these challenges of the students to an optimum extent. Most of the previous studies highly concentrated on the analysis of the errors in the writing of the student's home and abroad. This study is different from other studies because it only deals with the common challenges of the students in writing. The study will in general, help language teachers, students, material developers and policy makers to go into the depth of findings and to have the necessary actions to the development of English learning especially in terms of reducing the mistakes of the students in their writing.

3. RESEARCH QUESTIONS:

1. What are the common challenges the students of tertiary level encounter in their writing?
2. What are the causes of committing these?
3. What are the probable remedies of these mistakes?

4. METHODOLOGY:

This research was qualitative in nature (Creswell, 2008**).** The study was conducted among the students who were studying at first and second semester of CSE, EEE, English, Law and Business departments at a private university. All the students have to have a compulsory English course in first and second semester. For conducting the study, forty students were selected randomly whereas 20 students were from first semester and the rest 20 from second semester. The students of first semester were given the topic 'Your Country' and the students of second semester were given the topic 'Your Native Village'. Both the duration of time and the length (word limit) of the topics were set by the researcher. Furthermore, they were well informed that this writing would not affect their result, rather it was being taken for conducting a research and for investigating what types of common mistakes   especially in writing university students commit. Data were collected from the writing of the students. Open ended questions were used for the teachers' interview along with observation schedule of the teachers. In this connection, four teachers were interviewed individually. The collected primary data were transcribed and analyzed thematically (Creswell, 2008). Triangulation was carried out to identify what was common in terms of mistakes and to find out the gaps observing the data of the respondents.

5. LITERATURE REVIEW:

A great sum of works have been accomplished previously regarding students' mistakes and errors in writing in many countries where English is taught compulsorily as the second language. Previous studies showed that L2 learners have huge problems in writing and in this connection, Nunan (1999) stated that writing in second language is very challenging and tough for the learners. The studies of Nanun (1989), Seyabi and Tuzlukova (2014), Darus and Ching (2009), Javed and Umer (2014) and Heaton (1979) revealed that L2 learners committed huge mistakes in their academic writing and in most cases they did common mistakes which were not hard to be avoided. The common mistakes in article, spelling, verbs, punctuations and the mechanism of writing were found in the L2 learners' writing. Croll and Willson (1995), Byrne (1988), McCuen & Winkler (2000) stated in their studies that most of the students made mistakes in punctuations and the reasons of making mistakes are many. Moreover, McCuen & Winkler (2000) stated that as there is no universal rule of punctuation, students are prone to making mistakes with punctuation and their studies also revealed that students grew some common logics regarding common mistakes but at the time of their writing they forgot to use the correct punctuation in the right place. Salem (2007) argued that most of the students got puzzled when they were asked to write on a certain topic because they did not know how to start and how to conclude the writing. Besides, they have common problems with grammar and punctuation. Abu (2001) supports the argument and add some other information such as content, organization, purpose, audience, vocabulary, punctuation, spelling and mechanics.

John C. Mellen's (1975) explored in the study that students in different levels committed common errors. He showed that mistakes in spelling, punctuation, capitalization, fragments and run-ons, awkward constructions, agreement, and word choice were common in his study. Later the researchers like Izzo (2002), Nada (2002) supported Milan's findings and similarly gave some suggestions regarding the remedies of common mistakes in writing among the L2 learners. Almarwany (2008) was in the same echo and stated that grammar, organization and punctuation were the common mistakes done by the students.

Ahmed (1999) showed in his study that mistakes in articles are very frequent among the Bangladeshi students. In this connection, Hourani (2008) said that errors occurred due to the influence between inter and intra language of the EFL learners. Mustaque (2014) and Fahmida (2010) also revealed some findings in their studies that included errors with verbs, prepositions, article, organizational problems, spelling and punctuation.

Hamid (2007) found that teachers' feedback system was not clear enough to have a positive impact in minimizing mistakes in students' writing and it needs to be more effective in getting out the maximum output.

However, the present study is concerned with the writing challenges of the students and the common mistakes are meant to indicate such types of mistakes that can be easily corrected by the learners themselves using their 12 to 14 years learning experience.

6. ANALYSIS:

Data were collected directly from students' writing .The incorrect part is underlined whereas the correct part is bracketed presented in the analysis.

6.1. Spelling mistakes

The data collected from the writing of the students of first semester are given in the following.

a) We live in a very <u>beautifull</u> country. (beautiful)
b) <u>Their</u> are 64 districts in our country .(there)

The following data were collected from the writing of the students of second semester.

a) <u>Travaling</u> plays a very <u>significen</u>t role to human life. (Traveling, significant)

b) I <u>want</u> to Shat Gumbuj Mosque last month. (Went)

Spelling mistake is one of the commonest mistakes for the students of all levels irrespective of all ages. The mistakes with spelling are considered as the great mistake and obviously students' grades are directly affected for their incorrect spelling in writings. It was found after evaluating all the scripts that there was hardly any writing paper free from spelling mistakes. In the first example of the student from the first semester 'beautiful 'is mistakenly written. Generally there is no hard and fast rules of spelling, but if the word takes a suffix 'full' and gets united , then one' L' will be vanished and the word will be like 'beautiful' . In the second sentence 'Their' is used incorrectly. Besides 'their' is a possessive adjective that cannot go alone and it needs a noun after the adjective. So the pronoun 'There' will be the correct spelling and that will be used as Introductory in the sentence. In the examples of the students of second semester, Travalling, Significent and Want are misspelt.

6.2. Mistakes in verbs

The following examples are taken from the students of first semester.

a) There also many kinds of crops in Bangladesh such as rice, jute, wheat etc. (are)

b) Different countries <u>has</u> different traditions. (have)

These are quoted from the students of second semester

a) We can <u>visited</u> any place by bus now a days. (visit)

b) Many rivers <u>are look</u> so pretty in our country. (are/look)

Verb is considered as living being of a sentence as no sentence makes a complete sense without the proper use of verb. The data revealed that the students did common mistakes in verbs. From the writing of first semester, it is found that in the first example there is no 'be (main) verb' and without a main verb, no sentence is formed. In the second example, 'Has' is a singular verb as the subject is plural, verb will be 'Have' (plural). Similarly, the students of second semester made mistakes when they used past form after the modal verb 'Can' in the first example and in the second example, either 'Are or Look' has to be used but two verbs cannot match the tense.

6.3. Mistakes in capitalization

The examples are taken from the students' scripts of the first semester.

a) I love my <u>Country</u> very much. (country)
b) My friend and <u>i</u> love sight-seeing in the country side. (I)

The examples are from the second semester students:
a) I like various traditional <u>Food</u>. (food)
b) There <u>Are</u> many <u>People</u> who love their village .(are, people)

It was found from the scripts of the students that they made mistakes in capitalization. There was hardly any script written by the students free from this kind of problem. Though students learn the rules of capitalization several times, they consciously or subconsciously make mistakes in capitalization. In the first phase of the example, the word 'Country' was written with capital letter but at the middle , small letter must be used and in

the second example, the letter I is written in capital form but here it was used in small form. Similarly, the three words like food, are and people were mistaken in the form of capitalization.

6.4. Mistakes in number

These first two sentences are the examples of first semester students:

a) Bangladesh has many attractive place such as Sundarbans, Cox's bazar and Shatgombuj Mosque etc. (places)

b) Some came from other community. (Communities)

The writing of second semester students are:

a) Every year many tourist come to our country. (tourists)
b) It is one of the greenest country of the world. (countries)

It is found from the data that students commonly committed mistakes in number (singular, plural). Many in the first example and other in the second example are considered as plural determiners and so after many and other plural nouns have to be ensured. In the second two sentences 'Many' and 'One of the' follow plural countable nouns so that instead of tourist and country, they will be tourist and countries.

6.5. Mistakes in tense

The first two lines are quoted from first semester:

We celebrated many festivals every year. (Celebrate)

Muslims, Hindus, Christians and Buddhists lives here with peace and harmony. (Live)

The following lines are from second semester students:

It become independent on the 16th December in 1971. (Became)

The place becoming more progressive by solving these problems one by one. (Is)

Major mistakes are found in the first two sentences because students could not use the correct the tenses. In the first sentence the time phrase Every year confirms present tense , so the correct form of verb will be ' celebrate' instead of celebrated and in the other sentence the subject is plural and in case of present indefinite tense we need not add s' or es with the verb if the subject is plural . The correct answer will be 'Live'. The second two examples quoted by the students of second semester deal with the correct use of tenses. In the first one, Become will change into Became as it is simple past and in the second one, there needs a continuous form that is, auxiliary and verb ing as we know verb ing always needs auxiliary if it turns into continues.

6.6. Mistakes in passive sense

The following examples were taken from the scripts of the students of first semester:

a) The Padma, The Meghna and The Jamuna are consider as main rivers in our country (considered)
b) The mother language is Bangla which was achieve in 1952. (achieved)

The second semester students wrote in such way:

a) The construction of Lalbag Fort was commence in 1678. (commenced)
b) The mosque originally referred to sixty pillared mosque. (was referred)

Students did huge mistakes in terms of identifying active and passive verbs in their writing. In the first examples, students did neither active nor passive, rather they wrote incorrect sentences in their scripts. Subject of the passive sentence is always inactive and so after auxiliary verb, past participle of the verb is required. The similar thing happened among the students of second semester but there was a bit exception in the second sentence of the second semester students , where it was found that in case of passive , auxiliary verb is missing . 'The mosque' was an inactive subject, so it could not refer anything, rather the correct form will be 'was referred'.

6.7. Incorrect use of gerund and infinitive

a) Village farmers invite their friends to celebrating the Nabanna Festival. (celebrate)
b) For win the world, Bangladesh cricket team is playing.(winning)

The writings from the second semester students in the following:

a)   We visited Bagerhat, Khulna especially to <u>observed</u> the big mosque.(observe)
b)   To <u>travelling</u> to Khulna was interesting and for go there we hired a nice bus. (travel)

Using gerund (Verb+ ing) and infinitive (To +base verb) is a very challenging issue for the students. In the first two examples, 'To celebrating and For win' were incorrectly used in their scripts. It was required to write 'To celebrate' in the first sentence and 'To travel' in the second sentence because after infinitive base verb is needed and after for verb (ing) is needed. In the second phase, students wrote 'to observed and to travelling' which are incorrect and the correct forms will be 'to observe and to travel' respectively.

6.8. Mistakes in sentence arrangements

These are the examples of the students of first semester:

a)   <u>It's</u> about 30 lacs people sacrificed their lives to free their mother land from Pakistani barbarous army.(About 30 lacs people sacrificed their lives to free their mother land from Pakistani barbarous army)
b)   The four main rivers <u>are Bangladesh</u>. (The four main rivers are in Bangladesh)

Examples from the students of second semester are here

a)   <u>Catching fish in the river</u> I saw some fishermen .(I saw some fishermen catching fish)
b)   Dhaka is the largest city of the country <u>which is our capital</u>.(Dhaka which is the largest city of the country , is our capital)

The data revealed that students were not able to arrange their sentences according to the proper sentence order. The first two sentences of the first semester students stated that students had problems in sentence arrangement. From the first sentence, the word 'It's' should be omitted to make sense of the sentence, similarly, in the second sentence, preposition 'IN' should be placed before Bangladesh to make the sentence meaningful. In the second phase, 'Catching fish in the river' did not talk about the subject 'I' rather it talked about the fishermen and so, mismatching was found there and in the last sentence of the students of second semester, the clause 'Which is our capital' should be referred to Dhaka city but in the sentence, this clause referred to the 'Country'. Consequently this part was mistakenly used.

6.9. Mistakes in article

The following two sentences are the examples of the first semester students:

a)   <u>16th December</u> is the victory Day of our country. (The 16th December)
b)   Now Bangladesh is <u>a</u> independent country like many other countries of the world. (an)

Students of second semester wrote in this way:

a)   It is one of <u>a</u> greatest architectural sites in Bangladesh .(the)
b)   It is <u>a</u> important place in our country. (an)

From the data, it is found that students made mistakes in article frequently. The first example of the first phase, there is an absence of article 'The' before 16th December because article 'The' is required before remarkable days and in the second sentence, students mistakenly wrote A before vowel. Actually we use 'An' before any vowel. The first sentence of the students of second semester contained an article mistake. Article 'The' is required before superlative degree. The last sentence of the second phase repeated the same mistake as it was in the second sentence of the first phase.

6.10.Mistakes in pronoun

The mistakes of the students of first semester are as:

a)   Our country got <u>it's</u> freedom from Pakistan in 1971 .(its)
b)   Bangladeshi people have <u>there</u> dress patterns.(their)

The mistakes of the writings of the students of second semester are as follows:

a)   It is <u>us</u> who made a plan to go there.(we)
b)   <u>Me</u> and some of my friends made an interesting trip to Bagerhat from Dhaka.(I)

The data collected from the writing scripts of the students showed that pronoun mistakes were very common among the students in their writes up. The first example from the first semester presented IT'S wrongly instead of ITS. Here ITS is a pronoun whereas IT'S indicates IT IS. In the second sentence, There is wrongly used, rather the correct form will be the possessive pronoun 'THEIR'. Similarly, in the first example of the writing of the students of second semester US is mistakenly written because after BE Verb, the subjective form of the pronoun is required. So, it should be WE instead of US and in the last sentence 'Me' is an incorrect form, rather it will be "I" as subjective form of pronoun is required in the subject.

7. DATA FROM TEACHERS' INTERVIEW:

It is found from the teachers' interviews that majority of the teachers said that they witness some common challenges while evaluating the students' scripts. A list of mistakes of the students which appear before the teachers remain shaped with the common attitudes of the learners in terms of writing any paper in the classroom or in the examination scripts. One of the teachers stated that students make a number of grammatical challenges and these occur due to the differences between English and Bangla language. In many cases teachers get habituated to observe these kinds of mistakes into the students' scripts. He shared his opinion in the following lines:

"The challenges in tense, punctuation, verb, number and spelling are very common in the writing of the students of tertiary level and it seems interesting when an individual does the same mistakes frequently all the times whenever he/she makes a writes up: I have ten years experiences in conducting English language classes and while taking writing classes, I notice that most of the students pass a very hard time and the classes seem boring to them. I have a keen observation about the mistakes committing in the students' papers that are almost deep rooted and when I enforce the students to break down the tendency of the mistakes they make, they do not consider it seriously, and rather there happens a series of the same mistakes in their writing".

Another English language teacher stated that in the classroom when he teaches writing, the most frequent challenges he has identified through his observation are punctuation and the problems with verbs and tenses. He stated in such a way regarding the common mistakes of the students:

"In Bangladesh, most of the students at tertiary level make almost the same types of problems such as the mistakes with verbs and tense that can be categorized with the single point of view: whenever I have a look into any writing script of my students, repeatedly these mistakes are found. Further he added that maximum teachers in our country follow grammar translation method in which students are bound to memorize the rules, consequently they do not find any interest in the class. Besides, there is hardly any application of the rules which they memorize.

The other teacher also said that students have the tendency to commit the same mistakes all the times because they do not take the feedback granted for learning. He also said that in every writing class, he has to observe the common mistakes such as mistakes in tense, punctuations, articles and verb related mistakes which can be easily avoided if students are attentive to the teachers' feedback. He asserted that

"Lack of motivations is one of the major causes for doing mistakes in their scripts. Besides, it needs proper attention of the students as well as determinations to get the maximum output in respect of correcting common mistakes."

All the teachers stated almost the similar reasons of the common mistakes of the students. Here describes the speech of a teacher clarifying the reasons of common mistakes:

"First, students memorize so many grammatical rules but they can get hardly scope to apply them in their real circumstances because the rules have had a far away from the context of writing. Secondly, teachers don't have enough time to give feedback for every student's writes up because class time is very limited. Thirdly, teachers only underline the mistakes students commit but do not give the clarification of the underlining incorrect parts of their writings. Fourthly as in the context of Bangladesh the class size is very big, it is very tough for a teacher to control such a big class taking them all the necessary equipment. In most cases, students do not keep concentrating on the teachers' lectures, rather, they do their own jobs sitting in the classroom. Sixthly, teachers only focus on completing his assigned task, not to discuss the error made by the students in the class."

8. FINDINGS AND DISCUSSIONS:

It is found from the analysis of the study that students made common challenges in spelling, punctuation and sentence arrangement. The mistakes in spelling, punctuation and in sentence arrangement were frequently found in the scripts of the students though they completed almost 12 years of learning English from class one to intermediate level, the mistakes they commonly committed were adhere and remained rooted throughout their student life. The findings are the same as Nunan (1999) and Fahamida.B   (2010)and Brown (2001)

 From the study of Abu (2001) I also get the same findings about the common mistakes of the students in writing.

The study showed that students were indifferent to their mistakes they have been habituated to committing in their writing or either they did not try to make them correct despite being repeatedly instructed from the teachers. The teachers' interview also includes the information that majority of the students at the tertiary level do the common mistakes and teachers can easily assume in which parts of   students' writing can be affected with mistakes. The researcher being a teacher of the tertiary level observed that students hardly receive feedback of their homework or classwork due to large class size and limited time frame. However students' attitudes are somehow responsible in creating consciousness to avoid the common mistakes and in many cases, they did not take feedback seriously.

As shown in the study, students made common mistakes with verbs, tense and passive sense. These three grammatical issues are much interconnected because tense and verb are inseparable soul of a sentence whereas one is affected, the other will be affected too and similarly, whether the verb of a sentence does work or not is traced from the active or passive sense of a student. The teachers found from the observations of the class that students keep hazardous while selecting verb, tense and passive forms in their writings. The findings are similar to those of Wee et al. (2010) and Zheng and Park (2013),

As evident from the study, students did mistakes with articles and pronouns and these mistakes occur in almost all of the writings of the students because in most cases, students are not conscious enough to follow the exact rules of using article and pronouns although they have theoretical knowledge but in case of any writing, they subconsciously do this. From the teachers' interview, it is found that mistakes in article and pronoun are very common among the students of the tertiary level which can be easily avoided. Mustaque (1999) supported the findings of the present study and he also got the same findings in his study.

From the teachers' interview, it is stated that feedback to the students with proper motivation can bring the positive impacts among the learners in terms of reducing common mistakes in their writings.

9. REMEDIES:

Based on the teachers' interview, the study outcomes some remedies and the classroom observation of the researcher also has some implications by which these common mistakes can be reduced. The study shows that motivation, feedback and grammar analysis are the three driving forces which should be introduced in terms of minimizing common mistakes in English writing of the students. Moreover, students and teachers should stand on the same platform and continue working at their level best in this vein so as to get the maximum output in reducing common mistakes.

Increasing motivation can be a good way to recover the gap between the teachers and the learners and to accelerate this, learners will be given priority on selecting their topics in order to practice writing. Besides, students should be notified that what advantages they will have if they do their writing with all the corrections. In this regard, teachers should not be harsh to the students' mistakes, rather take them courage to learn from the mistakes.

Giving communicative feedback is very important than traditional feedback. In the traditional feedback, teachers only underline the incorrect part of the writing and the application of this system is not enough to motivate the students towards corrections. On the other hand, communicative feedback makes the students eager to learn about the mistakes and so, they try to overcome the mistakes. Teachers should let the students engage in self-correction and it can be the best way of overcoming the mistakes. In addition, teachers should check out each script of the learners and give them oral and written feedback and to do this, large classroom should not be maintained to reach the every student for giving feedback with examples.

Teachers should give the students a clear cut conception regarding grammar and make the grammatical rules analyze before the students in a very simple way so that everybody can understand them. In this connection,

more examples should be given than the theory and similarly, interesting course curriculum should be introduced for the students. Besides, they should make the learners inclined to take class test on various topics in order to evaluate their mistakes.

Finally, students should have determination to get rid of their common mistakes and they should be attentive to the class. Regular attendance in the class is a must to have maximum output in checking out the common mistakes.

10. CONCLUSION:

The study explores the common challenges of the students at the undergraduate level in English writing. It is found that 10 types of challenges students frequently face in their writing. The mistakes in verb, capitalization, number, passive mood, the use of gerund and infinitive, sentence arrangement, article, pronoun and spelling mistakes are common in students' writing. Moreover, it is found from the teachers' interview that majority of the students make common mistakes in their writing that can occur from conscious and subconscious state of mind. Major findings show that most of the students are very reluctant to learning English, rather, they are compelled to learn only to pass the examination. In this study, the reasons of common mistakes made by the undergraduate university students were sought. Besides, it suggested a remedy so that these types of mistakes are easy to be corrected by the students. Obviously in this regard, teachers can play a very significant role to be the mediators giving positive outlook and help the students identify the common mistakes and make them ready for self-correction. Finally, if teachers help the students practice based on the findings of the study, no doubt, there will have hardly mistakes in students' writing.

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RESOURCE UTILIZATION AND QUALITY DELIVERY OF NOMADIC EDUCATION PROGRAMME IN NORTH CENTRAL NIGERIA FOR GLOBAL COMPETITIVENESS

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ABSTRACT

The study examined the relationship between resource utilization and quality delivery of nomadic education programme in plateau state Nigeria for global competitiveness. A correlational research design was adopted for the study. The population for the study are 650 respondents which comprised of the headteachers, teachers, parent-teachers, association executives and prefects. Sample of 450 respondents were selected using proportionate stratified random sampling technique. Three research questions and three hypotheses were formulated for the study. A self-designed research instrument tagged resource utilization and quality delivery questionnaire (RUQUDQ) was validated by the experts in Economic Education, Educational Management and the reliability index of 0.82 was obtained after subjecting the instruments to split half reliability method and tested at .05 using spearman ranking order statistics. Descriptive statistics like percentages, mean score and standard deviation was used to answer all the research questions whole. The hypotheses were tested with Pearson product moment correlation statistics at 0.05 significance level. It was however concluded that all the hypotheses tested were rejected which showed that low significant relationship existed between resource utilization and quality delivery indicators in nomadic education in Plateau state which affect global competitiveness of the programme in the state. It is however recommended that the local resources in nomadic education should be used during teaching-learning processes using practical and activity oriented for effective utilization of the available resource s. however, innovative approach for resource utilization in nomadic education in plateau state will definitely enhance global competitive of the programme.

Keywords: Research Availability, Quality Delivery, Nomadic Education Programme and   Plateau State.

Introduction

Education is regarded as the only sustainable tool for national transformation, social change and economic development. Due to the clamouring issues of equity access and quality education for the citizens at the global level. Ogundele, Dadas and Jankrur (2017) noted that equity, access and quality in Nigerian education all provisions had become emerging issue for the global competitiveness. However, the authors noted that the need to provide education for the disadvantaged groups like girl child, nomads, Fishermen, Rural out – of school children Education programme and children in Internally Displace persons camp Education. According to Akinnusi (2016), in a bid to provide quality educational provisions for the Nigerian citizens, the programme were instituted are Girl child education Nomadic education, disadvantaged group Education, universalization of Education and Distance learning system.

It should also be noted that for effectiveness and efficiency in the quality delivery of the educational programme for the global competiveness of the educational provisions, Ogundele (2016) advocated the needs for resource availability utilization and adequacy in order enhance global competitiveness of the educational programme provided for the disadvantaged group.

However, Educational resource can be defined as those materials and non-materials facilities that are provided by nature for enhancing quality delivery of educational system. Olunlade (2004) described material resources as

those natural or physical resources that are provided for the use of teachers during the teaching learning processes. The author however, categorized material or physical resources into instructional facilities, Equipment's, libraries, buildings, lawns and landscaping, transportations, and recreational facilities all which when provided an effectively utilized will aid teachers efficiency and effectiveness in the quality delivery of the instructional activities. Olayemi (2012) also described non-material resources or human resources as those teachers, noon-teaching staff and students that make use or upon which the resources provided are utilized from effectiveness, efficiency and global competitiveness of Nigerian Education system.

However, the basis for this study centered on the need to provide quality education for the nomads to make them compatible o the society and make them relevant to the society. However, the need to provide necessary resources for the Nomadic education programme in Plateau State. The Federal Republic of Nigeria (2013) in a bid to enhance equity, access and quality education among the citizens, advocated for the establishment of centre for Nomadic Education programmes in Nigeria, Established Nomadic primary schools, in every state of the federation. It should be noted therefore in Plateau state there are twenty nomadic Education schools distributed to every Local Government Area of the State. The rationale for this study is to find out the level of the resources provided, the rate of utilization and the effectiveness for enhancing global competitiveness of the nomadic Education provided.

Statement of Problem

Over the years the need for equal education opportunities for all citizens had been an emerging issues in Nigeria. However, in Plateau State the issues of equity, access and qualiy education for the citizens without prejudice had become issue of concern. To this en the study investigated the relationship between the resource availability, utilization and effectiveness and quality delivery of Nomadic Education programme in Plateau State. The study therefor examined the extent to which the level of utilization enhance global competiveness of Nomadic Education programme in Plateau State, Nigeria.

Aim and Objective of the Study

The aim of the study focused on the relationship between resource availability, utilization and effectiveness and quality delivery of Nomadic Education in Plateau State, Nigeria. Specifically, the objectives of the study are to:

1. Examine the extent to which the resources are provided for effective implementation of Nomadic Education programme for global competitiveness.

2. Investigate the rate of utilization of the resources provided for the implementation of the Nomadic education programme in Plateau State.

3. Find out the education programme that are instituted for effective quality nomadic education for global competitiveness

4. Determine the effectiveness of the resources provided for quality delivery of Nomadic Education.

5. Examine the problems militating against effective operation of nomadic education

Research Questions

The following research questions are raised to guide the study.

1. To what extent do the resources available for quality delivery of Nomadic Education in Plateau State for global competitiveness

2. To what extent do the available resources utilized for global competitiveness of Nomadic Education programme in Plateau State.

3. What are the available Education programme instituted for nomadic education for global competitiveness

4. To what extent do the resources provided are effective for quality delivery of Nomadic Education for global competitiveness

5. What are the problems militating against effective operation of Nomadic Education?

Hypothesis

The following research hypothesis are formulated and tested at .05 significance level.

1. There is no significant relationship between resource availability and quality delivery of Nomadic Education programme in Plateau State for global competitiveness

2. There is no significant relationship between resource utilization and quality delivery of Nomadic Education programme for global competitiveness

3. There is no significant relationship between the effectiveness of resource availability and quality delivery of Nomadic Education for global competitiveness in Plateau State.

Methodology

The study examined the relationship between resource utilization and quality delivery of Nomadic Education programme in Plateau State for global competitiveness. A descriptive research design of correlation type was adopted for the study. The population totaled 900 respondents in the 21 nomadic schools comprising a teachers, head teachers, students and parents were used for the study. Sample of 450 (50%) respondents were selected using proportionate sampling technique. Five research questions and four hypotheses were formulated to guide the study. A self-designed instrument tagged Resource Utilization for Quality Delivery Questionnaire (RUQDQ). The instrument was validated by the experts in Economic of Education and Educational Management split-half reliability was used to test the reliability index of .82 after subjected to spearman ranking order statistic at .05 significance level. All the research questions raised were answered using Descriptive Statistics like mean scores and standard deviation and all the hypothesis were tested using Pearson product moment correlation statistics at .05 significance level.

The data collected were subjected to statistical package of social sciences (SPSS) 2.50 for the analysis

Data Analysis

The data collected were analysed using descriptive statistics while inferential statistic was used to test all the hypotheses, find below the result

Research Question 1: To what extent do the resources available for quality delivery of Nomadic Education for global competitiveness?

Table 1: Resource availability for quality delivery of Nomadic Education for global competitiveness.

S/No	Statement	$\dot{X}$	Sd	Decision
1	The government provide classroom buildings for effective instructional activities in Plateau State	24.5	2.83	Agreed
2	Well trained teachers are employed for the nomadic education teaching-learning processes	9.64	2.74	Agreed
3	Financial resources are provided	25.21	2.82	Agreed
4.	Adequate physical resources are provided for effective teaching-learning processes towards global competitiveness	18.33	2.58	Agreed
5	Nomadic education teachers are well motivated for quality delivery for global competitiveness	12.43	2.11	Disagreed
6	Motorcycle are provided for the Nomadic Education teachers to trace the nomadic for teaching	11.63	2.81	Agreed

Table 1 indicates that government provide adequate classroom buildings for effective instructional activites, that well trained teachers are employed for the teaching learning process also that adequate physical resources like

equipment, books, teaching aids are provided towards enhancing global competitiveness of the programme, only that the teachers are not well motivated for effective usage.

Research Question 2: to what extent do the available resources utilized for global competitiveness of the Nomadic Education of Plateau State?

Table 2: Resource utilization for quality delivery for global competitiveness of Nomadic education

S/No	Statement	$\dot{X}$	Sd	Decision
1	There is optimization of the resources usage for the teaching-learning process	41.31	2.11	Disagreed
2	Nomadic education teachers are motivated by way of good pay	40.36	2.18	Disagreed
3	The resource utilization by the teachers are effectively monitor by the Ministry of Education	13.44	2.33	Disagreed
4.	The nomadic environmental resources are used for their modern training	12.27	2.21	Disagreed
5	Environmental resources are used for practical teaching of nomadic education teachers	11.39	2.13	Disagreed

Table 2 shows that the resources provided are not optimally utilized, the teachers are not motivated, there is no effective monitoring and the available environmental resources like cow skins, milks, forests, grasses are not effectively used for training of nomads students.

Research Question 3: what are the available nomadic Education programmes instituted for global competitiveness in Plateau State?

Table 3: Nomadic Education programmes instituted for global competitiveness in Plateau State.

S/No	Statement	$\dot{X}$	Sd	Decision
1	Training of nomads for modern transformation of environmental resources	8.72	2.13	Disagreed
2	Integration of Western Education with Islamic Education programme	7.88	2.72	Agreed
3	Mobile learning was instituted for the teaching and learning processes	18.24	2.17	Disagreed
4.	Home grown feeding was instituted by the government to encourage the children stability in the school	17.21	2.18	Disagreed
5	Evening learning programme are initiated for the nomadic children to enhance effective participation	14.31	2.22	Disagreed
6	Dairy educational programme are provided for effective modernization of nomadic products.	12.22	2.24	Disagreed

Table 3 shows that the level of the utilization of the available resources are too low to enhance global competition of the Nomadic education programme among other nations. The respondents disagreed that the trainers did not use the available environmental resources, they did not use

Research Question 4: to what extent do the resources provided for quality delivery are effective for global competiveness?

Table 4: effectiveness of the resource provision for quality delivery and global competitiveness

S/No	Statement	Ẋ	Sd	Decision
1	The resources availability aid skills acquisition of the nomads for global competiiveness	28.32	2.12	Disagreed
2	Effective utilization of the resources aid equity access an quality of Nomadic education programme	18.64	2.82	Disagreed
3	Environmental resources in the nomadic schools develop self sufficiency and job creation of the nomads	12.43	2.16	Disagreed
4.	The communities in Plateau State rely solely on the nomadic education resources for industrial development	22.31	2.20	Disagreed
5	The resources availability and utilization aid global competition with other system of education	20.22	2.24	Disagreed

Table 4 shows that total the effectiveness of the resources provided for the quality delivery of nomadic education for global competitive were not shown. The respondents agreed that the resources available suppose to aid skills acquisition of the Nomads but no shown in the attitudes. The respondents agreed that the program aids equal educational opportunities for all citizens but the nomads did not make use of the opportunities

Research Question 5: What are the problems militating against effective operation of nomadic education for global competitiveness in Plateau State?

Table 5: Problems militating against effective operation of nomadic education programme in Plateau State, Nigeria.

S/No	Statement	Ẋ	Sd	Decision
1	Cultural orientation of the nomads	12. 64	2.76	Agreed
2	Political instability	18.48	2.56	Agreed
3	Negative parental attitudes to educational provision	17.48	3.31	Agreed
4.	Poor technological know how			
5	Over reliance on the sedenterial job of animal rearing	18.78	2.86	Agreed
6	Constant change in climate and weather condition	17.81	2.56	Agreed
7	Constant movement from one abode to another	18.86	3.42	Agreed
8	Security challenges that destroy most of the available resources	16.78	2.55	Agreed
9	Negative attitude to the change in their mode of living	17.48	2.58	Agreed
10	Poverty level of parents	15.63	3.51	Agreed

Table 5 shows that there are many problems that militate against effective implementation of nomadic education program for global competitiveness. Prominent among the problems agreed upon are culture, politics, negative attitude to education, security challenges, climate changes, sedentrial movement of the nomads from one place to the others. The problems affect the programme for competitiveness especially in Plateau State.

Hypothesis Testing

The following hypotheses generated are tested using Pearson product moment correlation statistics at .05 significance level. Find the result

Ho1: There is no significant relationship between resource availability and quality delivery for global competitiveness in Plateau State.

Table 6: Resource availability and quality delivery for global competitiveness of Nomadic Education programme in Plateau State

Variables	No	Ẋ	Sd	Df	Calculated r-value	Critical r-value	Decision
Resource availability	450	15.32	10.33				
				449	.22	.196	Ho1
Quality delivery	450	17.44	10.47				Rejected

Table 6 shows that the calculated r-value of .22 is greater that the critical r-value of .196 at the degree of freedom of 449 and tested at .05 significance level. Hence the null hypothesis that stated that there is no significant relationship between resource availability and quality delivery for global competiveness is rejected.

Ho2: There is no significant relationship between resource utilization and quality delivery for global competitiveness of nomadic Education in Plateau State.

Table 7: resource utilization and quality delivery for global competitiveness of Nomadic Education in Plateau State, Nigeria

Variables	No	Ẋ	Sd	Df	Calculated r-value	Critical r-value	Decision
Resource utilization	450	24.72	19.26				Ho2
				449	.23	.195	Rejected
Quality delivery	450	17.44	10.47				

Table 7 shows that the calculated r-value of .23 is greater than the critical r-value of .195 at the degree of freedom of 449 and tested at .05 significance level. Hence the null hypothesis that stated that there is no significant relationship between the resource utilization and quality delivery for global competitiveness of nomadic education programme is however rejected.

Ho3: there is no significant relationship between effectiveness of resource availability and quality delivery for global competitiveness of nomadic education in plateau state Nigeria.

Table 8: Effectiveness of resources availability and quality delivery for global competitiveness of Nomadic education programme in Plateau State

Variables	No	Ẋ	Sd	Df	Calculated r-value	Critical r-value	Decision
Effectiveness of resource availability	450	15.32	10.33				Ho3
				449	.28	.196	
Quality delivery	450	17.44	10.47				Rejected

Table 8 shows that the calculated r-value of .28 is greater than the critical r-value of .196 at the degree of freedom of 449 and tested at .05 significance level. Hence the null hypothesis that stated that there is no significant relationship between effectiveness of resource availability and quality delivery of nomadic education for global competitiveness is however rejected.

Discussion of Findings

The study investigated the relationship between resource utilization and quality delivery of Nomadic education programme in plateau state, Nigeria. The issue of concern is whether the available resources are effectively utilized for the operation of Nomadic education programme for enhancing global competitiveness in the areas of equity, access and quality delivery. However, the statement in respect of the extent to which the resources are available for quality delivery for global competitiveness of nomadic education programme. The respondents agreed that the physical, human and financial resources are made available for the quality delivery of the programme for global competitiveness. However, it shows that resources availability have significant influence on the quality delivery of education system. The study however showed that despite the availability of the resources it has little impact on the quality delivery of the Nomadic education programme for global competitiveness. The result negate the opinion of Oke(2017) which noted that with the availability of physical resources, the effective utilization will aid students academic achievement in the school system. In this study the opportunities of the availability of the resources were not effectively used by the nomads for quality education in the interest of compatibility with the counterparts at the global level.

The available resources are not effectively utilized for enhancing quality delivery of Nomadic education programme in plateau state for global competitiveness. It should be noted that the utilization of the available resources for quality delivery is too low for the nomadic education programme implementation for global competitiveness. The study negate the opinion of Bello (2010) whose finding revealed that with the availability and effective utilization of physical, human and financial resources for educational provisions. The goals achievement are easy to be achieved, but with the nomadic education programme, the resources are not utilized well which made the quality delivery for global competitiveness so difficult.

The tables also indicated that there are problems that militate against effective use of the available resources such as politics, climate change, financial mismanagement, negative to education provision and changes. The finding however supported by Agbulu and Ogundele (2018) which stated that politics and ethical challenges in Nigerian education mainly constitute high blockage to quality delivery of Nomadic education.

However, all the three hypotheses tested were rejected, from tables six to seven, showed that the availability utilization and effectiveness of the resources for quality delivery of Nomadic education for global competitiveness of the programmes are rejected. The tables shows that in plateau state, the resources availability, utilization and effectiveness have very low significant relationship with quality delivery of Nomadic education programme. However that issue of global competitiveness of Nomadic education is so low. The result however negate the findings of Oladeji (2012), Aderinoye (2016) and Yakubu (2005) which opined that for effectiveness and efficiency of educational programme.

The available physical, human and financial resources need to be adequately utilized and effective utilization will enhance quality delivery and competitiveness of the educational programmes at the global level.

Conclusion

Result of the findings, revealed that the available resources have low significant impact on the quality delivery of Nomadic education programme and the level of utilization of those resources have been compounded by series of problems ranging from culture, religion, politics, climate change and sedentrial movement which greatly affect the quality delivery. It is therefore concluded that with the availability of the nomadic education resources, without effectiveness in the utilization the issue of global competitiveness become a forgotten issue in plateau state, Nigeria

Recommendations

Based on the result of the findings and the conclusion made the following recommendations were made.

The provision of physical human and financial resources should be responsibility of every member of the society. The adequate provision will bring the nomads to the streamline of educational system thereby encouraging equity, access and quality education for global competitiveness of Nomadic education programme.

Also, the ministry of Education and the Universal Basic Education Commission should initiate effective monitoring and supervisory techniques that will enhance strict compliance to the effective use of the available resources towards quality delivery for global competitiveness.

Furthermore, the nomadic education teachers should be adequately motivated in order to improve their morale for the job and enhance nomadic teachers job satisfaction. It should be noted that an happy teacher is an happy work. When there is happiness in the nomadic education teachers, they will be able to put in their best for quality delivery that will aid global competitiveness.

Also, the three tiers of government and communities should initiate the taskforce that will encourage the nomads to go back to school and make use of the available resources for quality delivery and global competitiveness of the programme.

Finally, the stakeholders in nomadic education should organize workshops, conferences, retreats and seminars that will bring improving mode of operators for quality delivery and global competitiveness of the programme.

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SAFETY AND SECURITY CONSIDERATIONS IN SCHOOL PLANT CONSTRUCTION IN WEST AFRICA: IMPLICATIONS FOR RESEARCH AND DEVELOPMENT

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ABSTRACT
The quality of school plant construction determines the quality and extent to which the school environment is conducive, safe and secured for effective teaching and learning. This paper examines the kind of safety and security considerations that should be paramount in the construction of school plant in West Africa. The paper underscores the need for continuous research on ways of improving the safety and security of school plant construction to meet up with the modern security challenges as well as provide a stable school environment for sustainable educational development. It considers inadequate finance and neglect of safety and security specifications as among the major challenges in construction of school plant in West Africa. The paper therefore suggests that adequate financing and strict compliance to security specifications should be viewed as strategies for ensuring safety and security in school plant construction in West Africa.
Keywords: Safety, Security, School Plant, Construction, Development

Introduction

Security considerations have always been given pre-eminence when it comes to construction of Palaces, Castles, Villas and Lodges for Kings, Emperors, Presidents, Governors and Royalties. Likewise the rich and the powerful have never compromised security considerations no matter the cost, when they are constructing their mansions. There is always the feeling of a sense of safety and security when an individual finds himself in a well-constructed and secured environment. In spite of this however, when it comes to construction of school buildings and infrastructure, safety and security considerations seem to be given very little consideration and are indeed, sometimes grossly neglected particularly in West African schools. This anomaly has given rise to a situation where the quality of school plant construction is so poor that within a few years some school buildings begin to crack and collapse sometime with heavy casualties in terms of human lives and property.

The safety and security of staff and students in various schools is not negotiable. This is because no effective teaching and learning can take place in a state of insecurity. The need for school construction to pay more attention towards infusing the highest possible standards of security has become imperative. This is more so because school buildings and infrastructures have become targets of bombings, arson and other forms of destruction by terrorists and criminals. It is against this background that this paper examines safety and security considerations that should be emphasized in the construction of school plant in West Africa.

School safety refers to measures that are put in place in the construction of school facilities so as to protect staff and students from sustaining unnecessary injuries as they interact with school facilities. School security on the other hand refers to measures that are embedded in the construction of school facilities aimed at preventing and protecting the school from harmful, aggressive and dangerous external influences. Although safety and security are closely interrelated, this paper views safety as an internal issue in schools, which in most cases involve protection from accidental injuries resulting from unfavourable environmental conditions. Safety issues include fire outbreak, flooding, spread of diseases, hurricanes which result in bodily injuries. Safety hazards occur either through negligence, careless or by accident. Security involve protection from deliberate, unfriendly and dangerous actions that are usually perpetrated by external sources and same times even internally within the school capable of causing harm or even loss of lives and property. Security issues that could affect schools include shootings, bomb threats, kidnappings, theft, vandalism, hostage taking, raping and arson, among others.

School plant construction is the process of designing and erecting buildings, making roads, bridges, drainages, landscaping and other structures in a school environment. Sani (2007) viewed school plant as embracing the school site, school buildings in terms of classrooms, laboratories, workshops, libraries, playgrounds, furniture, as well as infrastructures which include road network, electricity and water supply. Simply put in broad terms, school plant refers to physical facilities that have been put in place in a school in order to create and sustain an enabling environment for effective teaching and learning (Manga, 2013).

Safety and Security Considerations in School Plant Construction

Safety and security are twin concepts that must be treated together as they are highly interrelated. It is difficult to draw rigid boundaries between the two as a safety matter could in other circumstances be viewed as a security issue. For example, an accidental fire outbreak in a school workshop could be viewed as a safety matter. But where terrorists deliberately set the school workshop ablaze, the fire outbreak could be viewed as a security breach. In school plant construction, safety and security from whatever perspective are viewed, should be uppermost in every facility that is to be constructed in a school environment. In doing so, the following critical aspects should be considered:

1. **School Location:** The first step in school plant construction is the selection of an appropriate school site. The school should be located in an area that is safe with special consideration to the following as identified by Manga (2014):

a. *Traffic Hazards:* A school should be located in a place that is safe from traffic accidents. It should preferably far from busy high ways or railway crossings to minimize the risk of students having frequent accidents in the process of crossing busy roads or railway lines on daily basis.

b. *Industrial Pollution:* A school should not be located in an industrial district that is prone to discharge of poisonous substances, dust, heavy smoke, and obnoxious gasses. Inhaling them could affect children's health.

c. *Topographical Hazards:* A school should not be located in rocky hills where students will be exposed to injuries from falling on harp stones. They should not be located in a swampy or water logged area that is most likely to be a breeding ground for mosquitoes, flies and other insects that can be harmful to students' health.

d. *Security Post:* The school should preferably be located in a place where there is police presence or any other law enforcement agencies that can respond rapidly to assist the school in times of urgent security needs

e. *Criminal Areas:* schools should not be located in some parts of urban centers that are known to be notorious in harboring criminals who might trespass into a school to commit atrocities.

2. **School Fence:** When an appropriate site is selected, it may be more appropriate to start the construction of school plant by erecting a formidable fence around the perimeter of the school. This will help to establish school boundaries from the start and as well as forestall future incursions into school land by members of the community. This will also help to avoid future boundary clashes between the school and the community with all the possible security implications (Chiaha & Mbanefo, 2013). Providing a strong school fence with only one entry and exit point located at the main gate will help to deter trespassers who would otherwise be passing through the school compound from different routes. A high solid wall with security spikes or barbed wiring or other sharp objects at the top will discourage those who might wish to jump or climb the school fence. Electrical fences with warning signs may also be considered.

3. **School Gate:** A school gate should be boldly and solidly constructed to withstand forceful entry. It should have a separate entry point and an exit point so that people can be checked when they are going in when they are coming out of school without obstructing traffic as in a one way channel. The entry and exit gates should have strong bars with stop signs attached to force vehicles to stop for security checks. The gate should be well lit at night see all people coming in and going out of the school. A **Security Room** should be attached to the main gate to provide shelter to security staff at the gate even when it is raining. The security room should also serve as a store to keep weapons and other gadgets that may be required for security duties.

4. **Security Office:** Provision should be made to construct a security office in the school. The security office should have a reception space, offices, a detention room, toilets, bathrooms, a changing room and a store. It should house the close circuit television (CCTV) monitors and other security apparatus. In addition it may have an extension where security dogs are kept.

5. **School Buildings:** School buildings are structures that have been constructed to provide shelter. In a schools setting, school buildings include: classrooms, libraries, laboratories, workshops, offices, administrative block, kitchens, dining halls, lecture theatres, student hostels, staff quarters, toilets, bathrooms, stores, common rooms, mosques, prayer chapels, sports complex, school clinic, and other structures. All buildings in general, regardless of the purpose for which they are constructed should have the following safety and security considerations.

a. *Ventilation*: School buildings must be well ventilated to allow for adequate circulation of fresh air. Windows should be large and aligned for cross ventilation. In addition functional fans and air conditioners should be

adequately provided to moderate adverse temperatures in school buildings. Ventilation of school buildings should be seen as safety measure intended to protect children from inhaling injuries carbon dioxide and other substances from stagnant expired air (Lugg and Batty 1999). Jeffrey and Lackney found that poor ventilation of school buildings is a health hazard as stuffy and buildings are associated with respiratory illnesses, sensory irritation, skin rashes and mental fatigue. Proper ventilation of school buildings enhances air circulation, filtration and minimizes pollutants.

b. *Lighting:* Provision of adequate lighting is s safety factor that should be taken into cognizance when designing and constructing school buildings. Gorof and Brophy (1995) found that students could experience fatigue, eye strain, blurry vision and headaches due to poor lighting in classroom, laboratories or libraries and workshops. They also found that students reacted more passively to classrooms that have large windows that allow for plenty of natural sunlight to flood the classroom. As a security measure, providing adequate security light both inside and outside the classrooms will enable staff and students to see and be seen in the dark. It encourages and exposes criminals from hiding under the cover of darkness to commit evil.

c. *Colour*: The colour of school buildings should be carefully chosen for security enhancement during the construction of school plant. Light colours keep school building cooler during the day than dark colours. Earthman and Lemaster (1995) stated that cooler buildings are more comfortable especially in West African tropical climate. In terms of security, light colors reflect more brilliantly at night under security lights than dark colours. Bright colours makes it easy to see criminal activity around school buildings at night than if the buildings are painted in dark colours.

d. *Acoustics*: School building design and construction should incorporate measures that minimize the effect of noise distraction as a crucial safety consideration. Prolonged exposure to high intensity noise in a school setting is often harmful to the health and behavior of large segments of exposed population. Evans and Maxwell (1997) found that a significant increase in blood pressure was associated with schools constructed near noisy urban streets. Noise could also emanate from within a school building.

e. *Doors and Windows*: The strength of doors and windows is a critical security consideration in the construction of school buildings. Doors and *Window Frames* as well as their *Hinges* should be such that they are not easily damaged by intruders. Windows should have strong *Security Locks* from the inside only, while doors should have security locks from both the inside and outside. *Burglar Proofs* could be installed on each window to prevent or delay access in case window frame is broken. Doors could equally be reinforced with iron bars form the outside. In addition, *Mosquito Netting* could be attached to windows in student hostels, staff quarters and other residential buildings where people sleep at night as a protection against mosquitoes. Doors should have peeping devices where the person inside the building can look and see who is at the door before answering the door.

f. *Corridors*: Provision should be made for safe corridors in the construction of school buildings. The layout of school buildings should be designed in such a way that corridors of school buildings help in crime prevention encourage positive student behaviour and enhance overall safety and security of a school.

g. *Security Devices*: Various security devices could be installed in the construction of school buildings. These in closed circuit television (CCTV), cameras, intruder signaling alarm systems that if triggered could produce sounding bells or sirens, intercom system, fire extinguishers and safes and telephones (Nation Association of School Psychologists 2013).

h. *Land Scrapping*: Safety and security should be paramount in the construction of school landscape. *Trees* should be planted to protect school buildings from the hazards of strong winds and rainstorms. *Drainages* should be constructed to channel rain water and prevent flooding in the school. *Carpet Grass* should be planted on school grounds as a protection against soil erosion in school premises. *Parks and Gardens* should be designed in such a way that they do not serve as a hiding place for criminal activities. There should be provision for staff and visitors *Car Parks* with signs fixed on no parking areas to restrict access to visitors

i. *Conveniences*: Adequate *Toilets, Urinals* and *Bathrooms*, as well as sewage and refusal disposal facilities should be provided. Poor *sewage* and *refuse* disposal facilities can constitute health hazards for staff and students. Facilities for safe drinking *water* and *food* administration should be put in place when constructing the school plant, as contaminated food and water can lead to health hazards. A *Powerhouse* should be constructed to house the schools generators to ensure stable electric power supply. Electricity is needed for security lighting and operation of electronic devices on security.

Implications for Research and Development

School plant construction is an area that requires a lot of research as it involves Architects, Engineers, Contractors Estate Manager, Educationists, Quantity Surveyors, School Administrators, Health Officers among others. School building design and construction is a rapidly changing phenomenon all over the world. There is a need for West African schools to catch up with world standards in school plant construction so as to provide a conducive, safe and secure school environment. Emphasis on safety and security in school plant construction will provide a stable environment for rapid educational development, which in turn is a pre-requisite for overall national development in West African countries.

Challenges of School Plant Construction

School plant construction in West Africa is faced with many challenges. One of the greatest challenges is that of inadequate finances to purchase high quality building materials that will ensure the strength and durability of school buildings. Thus there are several cases of building collapses which compromise the safety of school staff and students

In some cases there are no properly documented blueprints on security specifications to be adhered in school plant construction. Sometimes even where security standards are specified to guide school plant construction, they are often neglected out of error. There are cases where contractors deliberately connive with corrupt officers to cut down cost and end up providing poorly constructed school plant. In most cases no punitive sanctions are enforced to ensure compliance to security standards in school plant construction.

Suggestions

Based on the challenges examined, the following suggestions are hereby given to ensure that safety and security considerations are uppermost in school plant construction in West African schools:

1. Adequate finances should be provided by government and school proprietors to ensure quality construction of school plant

2. There should be clearly spelt out security specifications to guide school plant construction. Through supervision must be done to ensure strict adherence or compliance to security specifications in school plant construction

3. There should be strict sanctions on anybody involved in deliberately refusing to adhere to expected security standards in school plant construction in West African Schools.

Conclusions

The Problem of school safety and security has become an issue of global concern. In addition to other measures put in place to ensure safety and security of staff and students, proper school plant construction is considered as one of the topmost strategies of ensuring safety and security in schools. Poorly constructed school plant could constitute a safety hazard and or security risk that expose staff and students to all sorts of dangers. Research on ways of improving safety and security in school plant construction has become imperative in order to ensure high quality of education and national development in West African States.

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STUDY IMPLEMENTATION BLENDED LEARNING IN STUDENTS SKILLS AND BASIC CONCEPTS IN INDONESIA

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ABSTRACT
The development of the world of technology today has experienced rapid growth and development. Along with the development of this technology, the world of education must also be developed. Many ways can be used in the world of education to benefit from information technology. Educational institutions are increasingly qualified, even an international standard. Learning by using e-learning system will make the teaching and learning process can be done asynchronously. Students can learn without having to be in the same space and time. The implementation of blended learning in schools is produce information and communication, mainly in network technology in the shape of internet, generally combined learning models that include face to face learning model, face-off learning, and on-line learning Students can also learn with the desired stages and scopes. Communication and interaction facilities in the e-learning system will also make the interaction of teachers / lecturers and students / students not only limited to the classroom but can be extended by electronic communication.
Keyword: Blended learning, e-learning

Introduction

The development of increasingly advanced technology influential in the world of education is currently widely used in many educational institutions. Many ways are done in utilizing technological progress itself. One of them is electronic learning process that is better known as e-learning and application of blended learning where mixing between on-line learning with formal learning (face-to-face) (Vernadakis, 2012). The development of the world of technology today has experienced rapid growth and development. Along with the development of this technology, the world of education must also be developed. Many ways can be used in the world of education to benefit from information technology. Educational institutions are increasingly qualified, even an international standard. Competition in the field of education was widely encountered, but this competition is done in a healthy order to produce students who have great potential that advances the nation. One form of competition that exists among them is the use of technology itself.

In the analysis of this paper also explains the notion of e-learning and blended learning, what exactly is electronic learning. Electronic learning or better known as e-learning is a new way of learning and teaching system by using internet technology, where a teacher and his students can experience teaching and learning process not only in class and at the same time. The application is done in addition to e-learning is by blended learning. Blended learning is a form of ease of learning that integrates various delivery modes, instructional models, and learning styles, introducing a wide selection of dialogue media between facilitator and person who is being taught (Akkoyunlu, 2008). Blended learning or mixed learning is also a form of learning combination by using classroom and online meetings, but more than that as an element of social interaction. The benefits of using blended learning in the world of education today is to provide flexibility in choosing the time and place to access the lesson (Vernadakis, 2012). Students do not have to travel to where the lesson is delivered, By applying blended learning then it can be done from anywhere who has access to the Internet or not. This provides an opportunity for the learner to independently gain control over the success of learning. Learners are free to decide when to begin, when to complete, and which parts of the modules they want to learn first. If, after repeated there are still things that have not been understood, learners can contact the instructor, resource by email, chat or participate in interactive dialogue at certain times. Can also read the discussion results on message board available in LMS (Learning Management System). The benefits of blended learning itself adds more convenience than just e-learning because with a mixed method it is easier for learners (Jeffrey, 2014).

Blended Learning

Blended Learning model conceptually is a combination process or a mixture of excellence in the learning process conducted face-to-face learning in the classroom with the use of instructional media on line. According to Semler (2005), mixed model learning combines the best online learning aspects, coupled with organized face-to-face learning in the classroom and actual practice in the real world. Online learning systems, training or learning in the classroom, and workplace experience also have the disadvantage of self-learning learners. The mixed learning approach that uses an individual advantage to cover each other's weaknesses. Mixed learning is

an easy model of learning tools by combining different messaging models, teaching models, and learning styles and introducing dialogue options using medium learning medium between the facilitator and the person being taught (Akkoyunlu, 2008). Blended learning is also a combination of classroom learning off line and online through instructional media, but in fact the learning process mixes more than that, as a form of social interaction elements. Mixed learning is a learning that uses a combination of its delivery methods to be effective by using various means, learning styles and is found in communications conducted by using the media openly among all the parts involved in the learning process. As for the benefits of learning by using blended learning as a combination of teaching face-to-face learning in the classroom and online, but more than that as elements of social interaction are:

•   Incidence of interaction between teachers and students in teaching and learning activities
•   Teaching activities can be done on line or face-to-face
•   Blended Learning or mixed learning seeks to combine instructional modalities (or delivery media),
•   Blended Learning seeks to incorporate several learning methods.

What is mixed learning or blended learning? Blended learning is a learning model that tries to integrate or assemble several types of learning models. Along with the development of technology in information and communication that is in network technology such as internet in general, the learning is done by combining some learning model that is face-to-face learning or offline learning, and on-line learning (Vernadakis, 2012). On-line learning model can be learned by using web-learning, YouTube, blog, and so forth. While off-line learning can be learned by using CD, USB, DVD and so on. The main purpose of this mixed learning model is to seek an effective blend of learning models. Finally, online and face-to-face learning in the classroom models provide the following conclusions: (1) mixed learning models using video-based blogging media is an effective approach for students in learning; (2) blogging helps students' ability by 82% in improving their public speaking skills, such as speech, articulation, facial expressions, gestures and gestures; (3) students are also taught how to use a software in the form of computer multimedia and blog application through cooperative learning model; (4) students can see and make improvements over their weaknesses in learning and students can learn from the abilities of others from viewing videos on blogs; and (5) by applying mixed learning models to a lesson, students benefit from self-autonomy and collaborative learning, video feedback, instructor feedback and self-reflection. Implementation of a broader mixed learning model should be supported by various studies, so the percentage of each learning model can be known. Blended learning provides the best opportunity to learn from the transition class to e-learning. Mixed learning involves classes (or face-to-face) and online teaching (Jeffrey, 2014). This method is very effective for adding efficiency to the instruction class and allows for increased discussion or review of information beyond the classroom.

Formal Education

There are still more general criteria so that the classification discussed above really belongs to out-of-school education. This criterion is concerned with the definition (definition) of education so that there is a clear distinction between off-school education (including in which education programs are non-formal and education whose programs are informal with school education whose programs are formal). In this connection Sutjipto (2005) distinguishes the notion of the three types of education as follows:

Formal education is a systematic, structured, multilevel, tiered activity, from elementary school to university and equals to it; including academic and general-oriented academic studies, specialization programs, and professional training, are being conducted in a continuous time (Mallett, 2009). Informal education is a process that travels throughout the ages so that everyone gets value, attitude, skills and knowledge that comes from daily life experiences, environmental influences including the influence of family life, relationships with neighbors, work environment, and games, markets, libraries, and mass media. Non-formal education is any organized and systematic activity, outside of an established school system, conducted independently or an important part of a wider activity, which is purposely done to serve certain learners in achieving their learning objectives.

The above three understandings can be used to distinguish educational programs that include in each education path. Based on the three based on the understanding then it is clear that non-formal education is not identical both with formal education and with informal education. As an ingredient to analyze various educational programs, the three boundaries of education need to be clarified again by using criteria that can distinguish between education programs are non-formal with education programs are informal and formal. The difference between education whose programs are non-formal and informal can be put forward as follows (Mallett, 2009).

The former, education whose programs is non-formal, have organized goals and activities, are organized in the community and institutionalized, to serve the learning needs of learners. While the latter, education whose

programs are informal, is not directed to serve the learning needs that are organized. This second educational activity is more common, runs by itself, runs primarily in the family environment, as well as through mass media, playgrounds, and so on. On the other hand, if activities including education whose informal programs are directed towards a particular learning objective, such activities may be categorized into either education whose programs are non-formal or into formal education programs. As an illustration, radio and television broadcasting, as a source of information, education and entertainment for the community, arriving at people's homes at a given moment can be a source of learning activities on non-formal education programs or formal education programs. For example, programs that broadcast or display skills lessons, English lessons, smart-minded, etc. are examples of non-formal educational activities for listeners or viewers, in homes or places, deliberately for follow the broadcasts periodically or continuously while the open University lecture broadcast, presented through electronic media (television and radio) and print media, is part of the formal education activities for the students of the University. Allow increased discussion or review of information outside the classroom.

As for the listener or the viewers who are not intentionally to do the learning activities through the events before, then the activity of receiving messages delivered through the mass media is an educational event that is informal. Similarly, the utilization of information resources available in institutions or communities such as libraries, museums, reading boards, exhibits and newspapers provided to the public can be a source of learning for formal education programs and non-formal education programs if it is specifically integrated into formal education programs and / or non-formal educational programs. When using the three meanings of educators then the question arises: whether the term "education" is a place to describe informal activities? The next question, instead of using the term formal education, "is it better not to use the term informal activity" to describe the activity that appears to have been intentional or a coincidental learning event. To answer both questions above, it is worth mentioning here about the meaning of education formulated in the International Standard Classification of Education (ISCE) -UNESCO. According to UNESCO (1975), "education as organized and sustained communication designed to bring about learning" (education is as an organized and sustainable communication designed to foster learning) Dabbagh (2007). On the basis of this understanding, the main purpose of organized and sustainable communication is the emergence of learning. Thus the results of tangible education process, is the learning activities displayed by students and graduates of educational institutions. Behind attitude and behavior is not just learning to know something (Learning how to now), but learning to solve the problem (learning how to solve problems), even the most essential is to learn for the progress of life itself and environment (learning to live).

The interpretation of the organized term does seem somewhat narrower when it comes to the discussion of the education described here, because the word "organization" is an institution that organizes a program of learning activities in certain situations, and as an activity to organize professional or volunteer faculty for communication. The term organization does not include learning activities initiated and organized by a person or group of educators. The limitations of the investigations put forward by UNESCO give broad meaning to the process and purpose of organized communication. Based on this understanding, mass media, information institutions, messages, and other learning resources available in a community environment are communication suggestions to foster learning activities for individuals, groups, and communities. To complement the notion of education as described above, Sudjana (2001) provides a general limitation that education is a number of experiences with that experience, a person or group of people can understand something they did not previously understand.

The experience occurs because of the interaction between a person and group with environment. The interaction leads to a process of change (learning) in humans and then the process of change that produces development (development) for the life of a group or group in the environment. The learning process will result in changes in the cognitive domain (reasoning, interpretation, understanding, and application of information), competence (intellectual and social skills), and choosing and consciously accepting values, attitudes, rewards and feelings, and willingness to act or respond something stimulus. The process of change (learning) can occur by intentional or unintentional. Another view of education is put forward by. Assessment of activities programs included in formal, non-formal, and informal education by using the criteria of the presence or absence of intentions of both parties communicating, the educator (learning source or facilitator) and the learners (students or learning citizens).

Activities are characterized by the intent of both parties is the educator who deliberately to learners, and the learners who deliberately to learn something with the guidance, learning and training of educators, then the activity is classified into formal education and non-formal education. If the intent is only arising from the educator to help learners to gain learning experience, while the learners are not intentionally to learn something

with the help of educators, then this activity belongs to informal education. Similarly, if only the parties are deliberate learners to learn something with the guidance of an educator while the educator does not intentionally to help these learners, then this activity is also classified into informal education. However, if a learning event occurs accidentally from the educator and the learners then this activity is classified into learning by chance.

Criticism of this opinion is that education is a conscious and deliberate effort to prepare learners through counseling, teaching and / or training for their future role. There was no accident, especially from the educator. For example, a railroad collision with a car. Several minutes after the collision occurred, the train stopped. The train officers immediately removed the car that had been severely damaged and they corroborated the bodies of the passengers from in the car Someone or a group of train passengers helped to get the victims out and got information that the cause of the accident was due to the negligence of the driver who did not comply with the traffic signs on the trajectory of the trains that had been equipped with a latch. Although the train was approaching, the driver continues to run the vehicle.

Learning events that occurred at that time was the learning party is a person or a group of train passengers. The source of learning is the car crash that killed all its passengers. Factors that cause drivers are cars that do not comply with traffic signs. The learning process that occurs is a person or group of train passengers know the factors that cause the accident. With that experience comes the attitude about the importance of obeying traffic rules, especially when he or she drives a vehicle on the way through the railroad. The learning process in the event is called incidental learning. Teaching and learning activities are organized by a person or an institution for the education program, while on the other hand, a person or group of people just by chance just follow the program. For example, a farmer who happened to wake up at dawn, an hour earlier than his habit. Each wake up, usually he immediately set the radio to listen to the news. However, on that morning broadcasts that were heard from the radio were agricultural extension programs discussing the program and farming, especially the way of fertilizing rice in the paddy fields. Because he is a farmer, the messages in the counseling program continue to be followed seriously. In this activity, it can be seen that education is a person or institution that deliberately broadcast agricultural extension programs to the community, especially at cassava farmers. Learners are a farmer who happened to wake up early an hour earlier than his habit. While the learning activity is the farmers who receive messages on how to fertilize both parties, both education and learners. For example, education that deliberately teaches students and students deliberately to learn from the educator (teacher) is environment school education. In the out-of-school education program, this intent comes from the educator (facilitator, learning resource) that teaches the learners (learners) to help them do the learning activities, while the students were deliberately to follow the learning activities. Thus the intentions of the two parties in the learning process are the main characteristics of school education and education outside school. It is clear that outside education and school education have the same common traits, namely the existence of deliberate, organized, systemic, and both are sub-systems of the nation's education system.

Method

After discussing some understanding of education above then the question arises then what is the difference between educators outside school and school education. The most common way to do is to compare the details of the characteristics of school education on the characteristics of out-of-school education Sudjana (2001). As an illustration, on the one hand, school education has a sequential program for each type and level of education and can be applied uniformly in all places that have the same conditions. On the other hand, out-of-school education has a program that is not always fixed and not always tiered although it can be sequential, and in the program hearing the needs of learning and local conditions more attention. This research uses descriptive method, by describing the condition of the implementation of blended learning in schools. School education programs have a strict level of uniformity, while the educational programs are more varied and broader education. However, the characteristics of school education are more absolute to identify than the characteristics of off-school education.

Result

The biggest obstacle to e-learning is the direct interactivity between learners and their instructors. However learning is a two-way process. Participants need feedback from the teacher and the teacher also requires feedback from the participants. In this way will be obtained more effective learning results, on target. This answers why e-learning programs in many companies do not always get satisfactory results. Often the material is already widely available and available. People can also study anytime and anywhere. Can be from office, home, hotel, or at home cafe connected via wireless network. But still the level of use of e-learning materials is low. In my simple analysis, people need friends and need immediate feedback. Just as we feel in conventional training in the classroom.

The continued obstacle of e-learning is creating the impression of loneliness that one cannot last long in learning. Within half an hour, someone is lazy and less motivated to continue learning. Not because the material is not good or the online system of the presented material is less interactive, but the person feels being alone and he needs someone else. Although for a true learner it is not an excuse. But the facts show, people cannot survive long studying in front of the computer. Predictions in the future learning trends with blended learning will be more popular in the world, including Indonesia. This is supported by various factors. One is the shift in how people seek information. To find out certain information will sometimes turn on the computer and ask Google Uncle. Or if through the latest mobile phones, with just a few buttons and a light touch, the information sought already exists in the hand. Not only that, IT infrastructure is also getting better. Now people can watch videos directly from an unbroken mobile phone.

If active on the internet, free Open University programs and taught experts in their fields are accessible. Or if using iTunes, there are many podcasts and learning videos created by renowned institutions such as Harvard University, the BBC, and other organizations. With the ease, everyone can learn from the best instructors all over the world without having face to face to face. Learning like this is done through live discussions using audio-conferencing, interactive video conferencing, real-time chat console, and various variations. Learning materials can be downloaded and learned in advance in the form of text, audio and video, and can ask questions directly with the instructor giving the material, consulting for an idea and understanding, and building personal closeness. Although never face to face, still feel has a direct proximity to the instructor. This can happen because it interacts directly, although only virtually connected communication signals. Each other provides support, feedback and suggestions for each person's progress.

The development of information and communication technology has touched all aspects including education. The teaching and learning process that used face-to-face in the classroom expanded its reach into blended learning using ICT e-learning system. Learning by using e-learning system will make the teaching and learning process can be done asynchronously. Students can learn without having to be in the same space and time. Students can also learn with the desired stages and scopes. Communication and interaction facilities in the e-learning system will also make the interaction of teachers / lecturers and students / students not only limited to the classroom but can be extended by electronic communication.

The paradigm used in e-learning development is enrichment (enrichment) instead of replacement. Blended learning process is a combination of conventional learning methods in front of the classroom with e-learning. The number of face-to-face learning in the classroom will not be reduced by the existence of this e-learning system. Materials received by students / students online can be given the task of reading, writing or solving problems individually or in groups. This process is monitored by lecturers in the form of providing consultation, commenting and checking the results of the work. This material may be the task required to be undertaken by the student before following the next course. It is expected that with e-learning prerequisite and follow-up this face-to-face learning in the classroom can be optimized for discussion or learning in more depth. The e-learning system is also used in lectures for presentations to students. The files for the presentation can be uploaded for use inside to for use in the classroom. E-learning is generally designed as a system accessible only to people who are entitled to it. Users consist of admins, teachers / lecturers, students / students and others listed in this system. This system is designed for use by multiple disciplines. Each discipline will have its own subject / course that do not mix with each other. It is also possible to organize workshops or trainings online using this e-learning system.

Successful login users will have links to the courses / courses (courses) on the discipline that followed. Active subjects / classes will be featured in the welcome screen to make it easier for the user to navigate. The system will also connect to the Information System of the School / Campus so that the information of students / teachers, lecturers, subjects taken by students and subjects / lectures taught by teachers / lecturers can be obtained from the existing system. The e-learning system is an open system in the sense that students can access all courses offered. Students can also access the lecture material without the phasing out of the system.

Interaction and communication facilities are also an important part of this system. Interaction and communication electronically allows students and lecturers to communicate without time and distance. The communication process is also believed to be very helpful for students to gain and deepen the knowledge being learned. Discussion and chat forums are the initial facility provided. Discussion and chat forums provided are structured communication in discussing a course material. The system will record the discussions and conversations available so that the lecturer can provide the necessary comments and directions. In the learning system that is blended learning teachers / lecturers are expected to provide assignments for online discussions

utilizing existing facilities. Activity assessment of students / students online is also one of the parameters in student-centered learning method.

One of the main factors in blended learning is its content (content). The availability of lecturing materials in digital form (electronic teaching materials) is a strategic first step for the success of this system. Electronic teaching materials is a way of storing knowledge (store knowledge) in the form of lecture notes, practice questions, tasks, supporting reference and evaluation in an integrated manner using digital media. This allows for dynamic and adaptive teaching materials to be developed so that students' ability to think selectively will be honed and strong. The mix-match concept is an approach used in the utilization of digital lecture materials. With this concept, lecturers can exchange each other lecture material that is made. Future development plans are the enhancement of the capabilities of the system to perform some new functions as well as improvements from existing facilities. Future plans include:
1. Design content becomes important (instructional design). Content other than qualified and complete, should arouse interest in learning and provide the necessary pacing.
2. Improve the ability of the system to be able to serve pure distance learning. This includes more complete user management capabilities especially when it will be commercialized. In addition it includes the ability of the system to offer courses in the form of skills acquisitions in the form of workshops or online training.
3. Electronic Assessment, the system is able to provide an autocratic assessment of the given online tasks, assess the liveliness and provide feedback to the user.
4. Development of electronic teaching materials in the form of online simulations of certain topics that is required.
5. Streaming and Webcast server. Enables audio and video streaming as well as audio / video broadcast

Information and Communication Technology (ICT) in the Indonesian context is called Information and Communication Technology (ICT) in a very short time has become an important building material in the development of modern society life.

In many countries consider that understanding ICT, mastering ICT basic skills and having ICT concepts is part of the core of education, parallel to reading, writing and numeracy. UNESCO states that all countries, developed and developed, need to gain access to ICTs and provide the best educational facilities, so that young people who are ready to play a full role in modern society and able to play a role in the state of knowledge.

Due to the rapid development of ICT, continuous change is a challenge for many parties, from the Ministry of Education, teachers to publishers. The limitation of resources confines the education system. Yet ICT is thus of importance to the future industrial and commercial health of the country, so investment in equipment, teacher education, and support services for an ICT-based curriculum should be a government priority. The ICT curriculum for schools should be the latest. It is not effective to repeat the process of development of ICT education that is already running elsewhere, because it only slows down from catch up. The most important thing is to integrate and absorb all school lessons in ICT.

Many open opportunities with ICT inclusion in schools, the ICT curriculum in this book facilitate the use of these opportunities. Teachers need to be well prepared to apply the ICT curriculum. In fact, the application of a new curriculum should be carefully planned, managed, supplied, and continuously supported. The best development of faculty is if it is the result of a sustainable process, with many professional development activities in schools. Information and Communication Technology (ICT) for the purposes of this book, is defined as "the various technological tools and resources used to communicate and create, share, store and manage information". The technology includes computers, the Internet, broadcasting technology (radio and television) as well as per-phone. Despite recent interest in the use of computers and the Internet for education is increasing, but ICT is more than that. Printed material remains the cheapest, but old technology such as radio and TV for developed and developing countries remain a highly affordable and dominant delivery mechanism.

ICTs greatly assist in the acquisition and absorption of knowledge, allow developing countries to improve their education systems, improve policy formation and implementation, and increase the range of opportunities for businesses and the poor. One of the biggest obstacles to the poor, and many others living in poor countries, is the feeling of isolation. The new communication technology promises to diminish that sense of remoteness, and open access to knowledge in ways previously unimaginable. The gap between those who have access and control over technology and those who do not makes introducing and integrating ICTs at different levels of education very challenging. Failure here means that the gap of knowledge will widen and also increase economic and social inequality. ICT tools are great for extending formal and informal education opportunities to those previously excluded: remote populations, groups for cultural or social exclusion, minorities, women, and

people with disabilities, the elderly, and those who for reasons of cost cannot continue to the desired level of education. Anywhere, anytime. One of the characteristics of ICT is its ability to traverse space and time. For example, online learning materials can be accessed at any time. Radio or television broadcasting material, unrestricted, as well as teleconference technology.

Access to remote learning resources. Teachers and learners no longer need to rely on books and other printed materials, which may only be limited to distant libraries. ICT also facilitates access to speakers anywhere in the world. The ability to use ICTs effectively becomes an added value in an increasingly globalized job market. But technological capability is not the only skill demanded by the global economy. U.S. The North Central Regional Educational Laboratory recognizes "21st Century Skills" which includes the introduction of the digital age, intellectual thinking, high-level thinking and effective communication. ICTs have the potential to improve these skills and their use in improving the quality of education and fostering a student-centered learning environment. ICTs increase students' motivation and involvement, facilitate mastery of basic skills and improve teacher training. Motivate to learn. ICT such as video, television, multimedia computer, using various sounds, images, vibrant colors that stimulate student interest.

Submission of basic skills and concepts that are fundamental to high-level thinking and creativity skills are facilitated by ICTs with practice and repetition. ICTs are also used to improve access and quality of teacher training. When designed and implemented properly, education with ICTs increases the absorption of knowledge and skills that will empower students to learn throughout life. With proper usage ICT provides many new ways of teaching and learning. This new way according to constructivist theorists will shift from teacher-centered pedagogy to center on the learner. Active Learning. Learning with ICT enables learners to learn while doing, and makes learning no longer abstract but more relevant to their life situations. The student's involvement increases and the learner can choose what to learn when he needs to learn it. Collaborative Learning, ICT learning encourages interaction and cooperation between students, teachers and experts wherever they are. By working with people from different places, students will improve their communication skills as well as their global awareness.

Creative Learning. Learning with ICT drives creation and not just repetition of the information it receives. Integrative Learning. Learning with ICTs promotes thematic and integrative approaches to teaching and learning. This approach eliminates the boundary between the various disciplines and between theory and practice as in the classical approach. Evaluative Learning. Learning with ICT is directed and reviewed by the learner. With ICT, learners explore and discover, not just hear and remember.

Educational planners and policy makers should be clear about the intended targeted education. After a clear target, then the technology and modalities are chosen for that purpose. The potential of each technology varies depending on how it is used. At least five levels of technology use in education: presentation, demonstration, repetition and practice, interaction and collaboration. Any type of ICT: print media, audio / video cassettes, radio and TV broadcasts, computers or the Internet, can be used for presentations and demonstrations, the most basic level of the five mentioned above. Unless video technology, repetition and practice can be done with other types of ICTs. However, networked computers and the Internet are the most enabling of interactive and collaborative learning; and its full potential as an educational tool would be unattainable if only used for presentations and demonstrations.

Teleconferencing refers to "interactive electronic communication between people in two or more different places." There are four types of teleconferencing based on the nature of interaction and technological sophistication: (1) audio conferencing; (2) audio-graphic conferencing; (3) videoconferencing; and (4) web-based conferencing.

Audio conferencing is on the direct exchange of voice over the telephone network. Where text and images (graphs, diagrams, etc.) can also be exchanged in unison with voicemail, this is called audio-graphic conferencing. Videoconferencing enables live image exchange, in addition to sound and graphics. It does not use telephone network but satellite or television network (broadcast / cable).

As the name suggests, web-based conferencing is the transmission of text, graphics, audio and visual over the Internet, requiring a computer with a browser and communications can run simultaneously or not. E-learning includes learning at all levels, formal and informal, using information networks - the Internet, intranet (LAN), or extranet (WAN) - as the material, interaction and / or facility delivery. Some use the term online learning. Web-based learning is part of e-learning. Blended learning (integrated learning) refers to a learning model that combines traditional classroom practices with e-learning.

Open and distance learning is defined by the Commonwealth of Learning as "a way of providing separate learning opportunities between teachers and learners in terms of time and / or place; learning that is certified by an institution; use of various media, including print and electronic; two-way communication that allows learners and tutors to interact; there may be face-to-face meetings; and distinction of specialization in the production and delivery of material."

The Learner-centered environment according to the US National Research Council is an environment that "takes great care of the knowledge, skills, attitudes, and beliefs of the students they bring into the classroom." This comes from a theory of learning called constructivism, which view learning as a learner process construct meaning based on prior knowledge or experience. So knowledge is not acquired passively but from the active process of the learner transforming information, composing hypotheses, making decisions, using his mental model. For social constructivists, learning must be active, contextual and social. Best done in groups with teachers acting as facilitator or mentor. Research on the development of ICTs shows that in developing countries there are at least 4 approaches to how schools adopt and use ICTs. The fourth is a continuum. Schools that are still in the early stages of ICT development show an approach of emergence. Here they just bought or received ICT equipment, new administrators and teachers explored the possibility of using ICT in schools. They are still in the practice of teacher-centered teaching. The curriculum reflects an improvement in basic skills and an awareness of the use of ICT. This curriculum allows stepping to the next stage.

Furthermore, at the second stage, administrators and educators use ICTs for assigned tasks in school management including curriculum. Teachers still dominate the process of teaching and learning activities in the classroom. Schools in this phase are adapting the curriculum to improve the use of ICT in various fields of study with specific tools and software.

The next step, the absorption approach has integrated ICT in the curriculum, seen in schools that now use computer-assisted technology in the laboratory as well as in classrooms, and their administrative office space. Teachers are trying out new ways that enable ICTs in their productivity and professional competence. In this step, schools use information technology to creatively update the school's organization. ICT becomes an integral, though invisible part of personal productivity and professional practice. The focus is now centered on the learner, and integrates real-world subject areas in real-world applications. ICT is taught as a separate subject at the professional level and incorporated in all vocational areas. Schools become centers of learning in their communities.

Better learning and learning are not seen as separate activities, but as two sides of a coin, connected together. There are four stages in how teachers and students gain confidence in the use of ICT. Learning should show the stage of recognizing, learning how, understanding how and when, and specializing in the use of ICT equipment. The first stage that teachers and students learn in ICT development recognizes ICT tools and their functions and uses, which emphasizes the introduction of ICT and basic skills. Stage

After the introductory phase, here's how to use ICT tools, and start using them in different disciplines. This stage includes the use of general or specific ICT applications, and is related to the application approach in ICT development. The next stage is to understand how and when to use ICT equipment to achieve certain goals, such as completing a specific task. Here it is necessary to recognize situations where ICTs are useful, select the right tools for a particular task, and combine tools to solve real problems. This stage is related to the approach of absorption and transformation in the development of ICT. The final stage involves the specialization of the use of ICT equipment when more people enter science to create and support ICT. Here students learn ICT as their own subject and become specialists. This is more in vocational or professional education than in general education, and quite different from the previous stage in the use of ICT equipment.

Conclusion

The development of information and communication technology has touched all aspects including education. The teaching and learning process that used face-to-face in the classroom expanded its reach into blended learning using ICT e-learning system. Learning by using e-learning system will make the teaching and learning process can be done asynchronously. Students can learn without having to be in the same space and time. Students can also learn with the desired stages and scopes. Communication and interaction facilities in the e-learning system will also make the interaction of teachers / lecturers and students / students not only limited to the classroom but can be extended by electronic communication. It is expected that with e-learning prerequisite and follow-up this face-to-face in the classroom can be optimized for discussion or learning in more depth. The e-learning system is also used in lectures for presentations to students.

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THE POLICY OF TEACHER IN-SERVICE TRAINING (TST) IN INDONESIA

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ABSTRACT

Teachers are one key element in the education system, particularly at schools. In fact, there is growing public awareness that no teachers, no formal education. There is no qualified education without the presence of professional teachers in sufficient number. One of the ways for teachers who were already employed to gain access to new developments in education is to receive TST. This article aims to; analyze the policy of TST, identify factors influencing effectiveness of TST, and develop of model TST in Indonensia.

The study result shows that there are two paths of training and development of teaching profession in Indonesia; the first is professional training and the improvement of various teacher's competencies; second is career training and development. The factors influencing the effectiveness of TST in Indonesia include suitability of teacher qualifications and competencies, mastery of education and teaching technologies, presentation of training program, and evaluation technique. Some things to be developed in the future to improve teacher quality in Indonesia includes high standard recruitment system, professional development by research-based, integration of technology in teacher education and professional development, and effective evaluation system.

Keywords: Educational Policy, Teacher In-service Training, Professional Development

INTRODUCTION

Education is one of the important aspects in the development of a country. Abiogu (2014) explains that education is the foundation of the development of every country. Education is also seen as a determinative factor in shaping social economic, scientific, and technological developments. In other words, growth and development targets of every country should be preceded by good education planning. Similarly, UNESCO (2014) explains that education is not only a human need basic, but also an important aspect in achieving sustainable development of a country. Education plays a role in reducing poverty, improving nutritional and health, empowering and equalizing genders, ensuring sustainable energy and resources, economic growth, and many other sectors.

The success in achieving education goals is affected by many factors, including quality of teacher. Farstrup & Samuels (2011), explains that improving and maintaining the quality of teachers are important components to reach the established education goals. McKinsey & Co (2007) argue that the quality of teachers will certainly determine the quality of education system, so if the quality of teachers is low, the quality of education system will not exceed it. Moreover, to realize effective teaching practice, the quality of teaching staff should be improved first because the only way to have maximum education outcomes is teachers' effective teaching method.

Quality of teachers can be improved by professional training and development program. In fact, the needs for teacher training program performed in service should not be underestimated. TST is a necessity to improve teachers' performance and motivations. The absence of training program will set back the growth of teaching professionalism, creating discrepancy between demands and level of teacher achievement. TST can be performed by various activities such as seminar, workshop, conference, learning activity in classroom, exhibition, further study, training, etc.. The activities are designed to enable teachers to develop them selves and improve their competencies (Osamwonyi, 2016).

Indonesian education is undeniably left far behind internationally. Efforts to improve the education quality, hence are inseparable with the efforts to improve the teachers quality. Nowadays, there are a number of issues related to teachers' condition in Indonesia. *The first* is the diverse teachers' abilities in the learning process and knowledge mastery; *second*, the absence of accurate measurement in determining the teachers' abilities; *third*, the coaching done is not reflecting the needs, and *fourth*, the inadequate teachers' welfare. If those mentioned are left unaddressed, it will yield impacts on the poor quality of education. Based on this condition, this article will analyze the policy of TST in Indonesia.

THEORETICAL FRAMEWORK

1. Teacher In-service Training

Theories, strategies, methods, technologies and curricula on education change over time. Teachers require of Teacher in-service training (TST) in order to adapt themselves to these changes (Demirtaş, 2010). In order words, one of the ways for teachers who were already employed to gain access to new developments in education and educational technologies is to receive TST. Teacher In-service training is performed as an effort to achieve the criteria of quality teacher. Goe & Stickler (2008) propose four aspects which can be used to determine and assess the quality of a teacher, which are:

a. *Teacher Qualification*: teacher's credential, knowledge, and experience when performing teaching activity in classroom.

b. *Teacher Characteristic*: attitudes and attributes carried by teacher when performing teaching activity in classroom.

c. *Teacher Practice*: teacher-student interaction and teaching strategy

d. *Teacher Effectiveness*: "added value" showing that classroom teacher contributes to the students' learning achievement, as shown by student's improvement and higher than expected academic learning outcomes.

Therefore, aspects showing the quality of a teacher are usually defined as teacher competencies. Among a number of teacher's competencies, professionalism is one of the competencies which should be supported by developing sustainable professionalism. Kennedy (2005) proposes nine teaching professionalism development models which can be used as basis for Teacher In-Service Trainings. The nine models are below.

a. *Training*: focuses on skills and given by people with greater expertise.

b. *Award bearing*: usually related with scholarship grants for further education in college institutions.

c. *Deficit*: services to solve the deficit in each individual teacher. However, the method doesn't seem to be good for teachers' confidence and doesn't support collective development in school environments.

d. *Cascade*: development model which can be performed by relatively cheap resources, but doesn't really involve collaborative element in its implementation.

e. *Standard-based*: development model which assumes there is effective teaching system, but can be too narrow and limited and not flexible.

f. *Coaching/mentoring*: constructive development of relationships, requiring facilitators who can communicate well.

g. *Community of practice*: forming groups based on similar knowledge for cooperation, but may cause unsolvable issues and slow development because the members have the same abilities.

h. *Action research*: model which enables teachers to try different method in teaching, especially when performed collaboratively.

i. *Transformative*: combination of several other models by considering the issues at hand.

Beside the nine models above, Luneta (2012) summarizes a number of teaching professionalism development models.

Table 1. Teaching Professionalism Development Model

Model	Presentation Method	Purpose
Off-site programmes	Presented in universities based on lectures, teacher workshop, skill development model, and project-based model	Suitable for improving teachers' qualification and knowledge
School-based	Class observation, mentoring program, teacher workshop, seminar, action research, case study, skill development model, project-based model, coaching.	Most effective for improving learning strategy
School-focused	School workshop, action research, group discussion, observation on the best learning practice, project-based model, skill development model, coaching, mentoring, and lesson study.	Refreshing and improving content knowledge and teaching skill based on teachers' knowledge
Distance Education	Long-distance lecture, ACE, PGCE.	Suitable for improving teacher's qualification and content knowledge

Osamwonyi (2016), said that TST can be defined in simple terms as activities and trainings which are relevant and usable for teachers to improve their professional knowledge, skills, and competencies in the teaching profession. Therefore, TST covers all forms of education and training given to teachers who have been assigned positions in teaching. Moreover, TST is also defined as sustainable education designed to retrain, instill skills again, and renew teacher workforce's knowledge.

TST is performed by considering the following principles:
a. In-service program is applied by considering the needs of school and society
b. All school personnel require in-service education or training
c. Good supervision can be used to accelerate the improvement of in-service professionalism
d. In-service training must produce improved teaching quality
e. In-service education and training leads to sustainable examination and improvement process on education programs. The activities also support participants involved to assess themselves in terms of their competencies, achievements, and positions.
f. In-service education and training must be considered by state agencies, school boards, universities, and school administrators and teachers.
g. Supervisor in training must create an atmosphere which supports teachers to develop themselves during in-service training.
h. In-service training program must be performed based on research and support educational progress.
i. In-service training program is most effective if planned and performed cooperatively.

There are many types of TST, including:
a. Institutes: a series of lectures designed to give participants as much information as possible in a short time, usually in two or three days.
b. Conference: an activity which gives participants opportunity to ask each other and discuss the presented ideas.
c. Workshop: an activity performed by medium group, each person is given a problem to solve. The problem is closely related with their field.
d. Staff meeting: for in-service teachers, this activity is usually used to introduce teachers to administrative and policy users.
e. Committee: an activity involving several people as members to solve problems which can't be solved by the entire staff together.
f. Professional reading: an activity performed with the help of study group library.
g. Individual conference: depending on mutually supportive definition and abilities among teachers and supervisors.
h. Visit and demonstration: an activity which enables participants to observe real learning implementation by experienced teachers.

Base on that explains, TST is as an effective method of increasing the knowledge, skills and positive beliefs of teachers. It is a process used to continue the teachers'education once they have received their certification in teaching and are employed in a professional position.

2.   Benefits of TST

TST undoubtedly benefits the development of the professionalism of related teachers, application of learning activity, and learning outcomes achieved by students, and overall benefit for education. Osamwonyi (2016) said that with these programs, teachers will maintain their knowledge and follow developments/changes in methodology and curriculum. Moreover, teachers will regularly know which motivation they can do to develop their professionalism. The ultimate aim of TST programs are to ensure the effectiveness of teachers in the classroom and to increase student achievement consequently (Hewson, 2007). A directly proportional relationship was determined between the professional experiences of teachers and their participation in IST programs (Balta, 2014). It is also known that the more teachers participate in TST programs, the more student success will be achieved (Damar, 1996).

TST will keep developing as an inseparable part of sustainable teacher education. Although in-service training has been performed, there will be areas which require further development. TST will help closing the discrepancies in education. In sum, some of the benefits of TST are as follows.
a. Providing sufficient opportunities for serving teachers to renew their knowledge and skills to be better, without resigning from the current position.
b. Providing opportunities for school system to keep having trained and qualified teachers although in-service training program is in progress.
c. Enabling increased number of trained and qualified teachers at every education level.
d. Reducing financial burden for teachers who want to develop their professionalism, especially if their salaries can't cover the cost of further education and necessary trainings.
e. Providing a source of additional income for institution where Teacher in-service Training takes place.
f. Providing a source of additional income for staff involved in the program.
g. Providing opportunities for teacher education institutions to play a role in national development, especially by facilitating Teacher in-service Training.

RESULT AND DISCUSSION
1. Implementation of Policy of TST
a. Forms of TST in Indonesia
Teachers' participation in TST activities is aimed to reach teacher's professional competencies. The teacher's professional competencies include mastery of materials, structures, concepts, and scientific mindsets which support the subjects they teach; mastery of competency standard and basic competencies of the subjects/field of development they teach; creative development of learning materials they teach; sustainable development of professionalism by performing reflective actions; utilization of information and communication technology and self-development.

Teacher's self-development in achieving the competencies is performed by joining various teacher trainings provided by the government. Teaching professionalism development can be performed in three forms which are self-development (including functional training and collective activities of teachers), scientific publication, and innovative work development.

Beside education and training, other activities which can be used to train the professionalism of teacher in-service training include the following.
1) Discussion of educational issues: held regularly with topics related with issues at schools.
2) Seminar: teacher's participation in seminars and scientific publication training also can be a model of sustainable training of teaching professionalism in improving competency. This activity gives teachers opportunity to interact scientifically with their colleagues in the same profession regarding the latest issues to improve the quality of education.
3) Workshop: Workshop is performed to produce beneficial products for learning, improved competencies and career development. Workshop can be performed, for example, in curriculum analysis, syllabus development, RPP preparation, etc.
4) Research: Research can be performed by teacher in the forms of classroom action research, experimental research, etc. to improve the quality of learning.
5) Book/teaching material writing. Teaching materials written by teachers can be in the forms of dictate, textbook or book in the field of education.
6) Learning media creation. Learning media created by teachers can be in the forms of props, simple practicum tools, and electronic teaching materials (learning animation).
7) Technological work/artwork creation. Technological work/artwork made by teacher may be technological work which benefits the society and or education and artwork which has aesthetic value recognize by the society.

b. Evaluation of the Result of TST
Teacher performance appraisal is one of the steps to formulate teacher's competency improvement program effectively and efficiently. It's consistent with the decree written in the Regulation of the State Minister for Administrative and Bureaucratic Reform (Permenneg PAN dan RB) No. 16 of 2009. The performance appraisal is intended to determine teacher's real ability in teaching. Performance appraisal will also show the strengths an weaknesses of teachers in accordance with their responsibilities, whether classroom teachers, subject teachers, or counselor. Teacher performance appraisal is performed periodically and systematically to determine work achievement, including its development potential.

Beside obligation to join performance appraisal, the competency level of the teachers should be determined by competency test. Competency test is intended to collect information on teacher's real condition in educational and learning processes. Based on the result of competency test, teacher's competency profile is formulated by certain levels and the feasibility is determined. Therefore, the purpose of competency test is assessing and determining whether a teacher is competent or not based on the tested competency standards. Thus, teacher's competency improvement is rational and has strong empirical consideration. Teacher performance appraisal and competency test are essentially focused on the four competencies which teachers must have.

2. Factors Influencing the Effectiveness of TST
a. Teacher Qualification and Teacher's Competency
Teacher qualification and teacher's competency are regulated in the Regulation of the Minister of National Education No. 16 on Standards of Academic Qualification and Competencies of Teachers. According to this regulation, teacher's academic qualification in a formal educational unit differs consistent with the educational level being taught. Minimum academic qualification for teachers in Indonesia is bachelor's degree (D-IV) or

undergraduate degree (S1) of study program consistent with the subject they teach. Similarly, Fastrup & Samuels (2011) state that there are two main requirements to be fulfilled in quality teaching, i.e. all teachers should at least have undergraduate degree from accredited institutions and all teachers should join trainings in their respective assignment areas.

Meanwhile, the competencies which must be mastered by teachers include four main competencies which are pedagogical, personality, social, and professional competencies. Pedagogical competency is ability to manage students' learning, including understanding students, designing and performing teaching, evaluation learning outcomes, and developing students to actualize their potentials. Personality competency is solid, stable, mature, wise, and authoritative abilities, being a role model for students, and being noble. Professional competency is the ability to master teaching materials broadly and deeply to enable them help students achieve the competency standards established in the National Standard of Education. Meanwhile, social competency is educator's ability as a part of the society to communicate and interact effectively with students, fellow educators, teaching staff, student's parents/guardians, and local community.

The suitability of the qualification and competencies of TST with the qualification and competencies is an important factor for the success and effectiveness of teacher training in the future. It's because the basis of the success of a training system is teacher's ability itself. With suitable qualification and competencies, it will be easier for a teacher to develop their professionalisms further without being inhibited by factors related by the teacher themselves or administrative factor. To develop their professionalism, teachers who aren't qualified for the standard must join education in accordance with the requirements in effect. According to Nizam & Santoso (2013), the greatest challenge in teacher qualification program is related with Indonesia' geographic situation, transportation, infrastructures, and teacher's ability to maintain their performance.

b. Mastery of Technology in Education and Teaching

The importance of teacher's mastery of computer literacy and competency in online environment has been stated in many researches. In terms of the usage of technology related with computer in teaching in Indonesia, a study by Son etc. (2011) shows that generally teachers have limited time to access various computer applications. The mastered computer applications are generally word processors. Meanwhile, knowledge on database, concordance, and computer-mediated communication is lacking.

Moreover, a study by Inayati, (2015) also shows that teachers in Indonesia haven't fully recognized the potentials of social media technology in learning. Teachers are actually familiar with various types of social media, but few try to integrate it into learning. Many have never even integrated the technology to learning.

The findings imply that competencies related with ICT usage should be developed carefully in designing and implementing teacher training program. Teachers' experiences at various educational levels also vary in terms of computer and technology in learning. Therefore, there should be a training approach which can serve different teacher's backgrounds. With this kind of training program, each teacher can improve their personal abilities in using computer-based technology and apply them in teaching in classrooms.

c. Presentation of TST Programs

A number of new things should be noted regarding presenting training for the success of professional development programs. Some recommendations are as follows.

1) TST emphasizes effort to improve the effectiveness of teaching, solving practical issues in managing teaching and learning activities, and improving teacher's sensitivity to the individual difference of each student. The training programs must be well-coordinated, e.g. through Teacher's Working Group (Kelompok Kerja Guru-KKG) and Subject Teacher's Consultative Group (Musyawarah Guru Mata Pelajaran-MGMP). Moreover, teacher quality training program, for example through upgrade or other in-service trainings, should fully consider the issue by understanding students' conditions.

2) TST is performed to train teacher's sensitivity to students' backgrounds which naturally vary. Students' backgrounds also determine their motivations and learning achievements. Teacher's sensitivity to students' backgrounds and teacher's ability to handle them should be presented more in in-service education curriculum and trainings.

3) The role of education and training agencies should be optimized, supported by improving cooperation with The Institution of Education and Teacher Education (Lembaga Pendidikan Tenaga Kependidikan-LPTK), using workforce, developing curriculum and training software, and developing training accreditation system.

4) School's authority should be increased to determine the best for training teacher quality. The authority includes determining necessary activities and how to reach the purposes of the training.

Beside the suggestions above, the presentation of TST should consider the time required for a program. As we know, a training requires appropriate time to optimally reach its objectives. The result of the research by Osamwonyi (2016) shows that in adequate time for program presentation can be a problem for the

effectiveness of TST. The teaching hours for teachers in Indonesia are established in the regulation of the minister to be at least 24 teaching hours in a week. Due to long teaching hours, TST should also consider the adequacy of time allocation so that training objectives can be achieved as expected.

Moreover, the presentation of TST program should also consider the suitability of the approach and technique. Due to the varying issues and objectives to be achieved by TST in Indonesia, they should also consider the approaches they use, appropriate technique to achieve training objectives, etc. Technical things related to program presentation also should be organized and planned well, e.g. by deliberation involving parties related to the program.

Another classic problem for teacher TST is availability of facilities, including facilities and infrastructures. Teacher in-service education and training may require classroom, laboratory, or other facilities to support the planned activities. Beside availability of facilities, readiness of facilities to accommodate the participants and the activities should be planned well so that it can run efficiently.

d. Evaluation Technique Used in Assessing the Result of TST

Assessment of a TST should be performed to determine whether the training is effective or not. It's because not all training practices in teacher in-service training are effective. Previous researches have shown that teacher in-service trainings may produce different results.

The study by Bando & Li (2014) shows that TST is effective and improves student's learning. Based on the research result, teacher training can maximize students' learning achievements because it enhances teachers' knowledge on materials (subject knowledge) and aspects of teaching (pedagogical knowledge). The result of the study by Fozdar et al. (2007) also shows that training program on in-service teachers is effective, as evident in teachers' satisfaction to the training materials and programs.

However, not all results of TST are effective. A study by Dhawan (2014) shows that TST is ineffective in instilling knowledge on life skill and action research. Similarly, the study by Suzuki (2008) shows that TST by Cascade model is ineffective. It's because the messages given through training activities are often not relayed well, and it's difficult to produce any significant change in learning in classrooms. One of the things to be considered to make teacher in-service training effective is evaluation technique or assessment. Good evaluation will maximize the measurement of the training result. In this case, what's being measured, the measurement instrument in use, and who's measuring can affect training result.

In Indonesia, assessment for the development of teacher professionalism consistent with the established qualifications and competences is performed by supervisors. Standard for supervisors which include qualifications and competencies are regulated in the Regulation of the Minister of National Education No. 12 of 2007 on Standard of School Supervisor. The main duties of school supervisors are regulated in Permenpan an RB No. 21 of 2010 on Functional Positions and the Credit Score. The duties of supervisors are classified into duties for junior supervisor (8 duties), middle supervisor (10 duties), and senior supervisor (12 duties). In these duties, the main duties of school supervisors include: (1) training principals and teachers, (2) guiding principals and teachers, (3) monitoring the implementation of 8 National Educational Standards, and (4) training principals in developing professionalism, e.g. by various trainings.

3. Development of TST Model
a. *Recruitment System and Preparation of High Standard Future Teachers*

Indonesia can developed TST with high standard and complicated recruitment system. The teacher qualification applied in Indonesia based on a minimum of master's degree for teachers teaching at primary and secondary levels. Pre-service education for teachers receives a lot of attention, as well as professional culture, teaching, and high interest in students and learning.

Tight and selective teacher recruitment system is also shown by the low intake compared with the much higher number of applicants. It's because teaching is a popular profession, and because interest on students and teaching and learning activities are old traditions. The recruitment system to accept teachers is open, and the evaluation does not follow external standard but standard developed internally by each school. Due to better recruitment system, teachers have good qualification and professionalism, able to work autonomously and reliably although the system doesn't emphasizes control.

Sahlberg (2011) explains one of the recruitment processes in Finnish schools. The acceptance system is very fierce, only 1 of 10 applicants will get further opportunity to learn and teach as a teacher. After going through

complex matriculation process, candidates are selected based on their achievement record in college, and other supporting achievements. Then, the candidates join written examination on theories of education and learning. The candidates also must be involved in observing learning activities and situation at schools, in which stage social interaction and communication skills are assessed. The top qualified candidates are then interviewed on various things, including their motivations to dedicate their careers in teaching. Next, the candidate with the best score will join pre-service education program with the expenses paid by the government.

Therefore, it's concluded that Indonesia applies a very organized system for teacher candidates. The system also includes teaching practice and observation which must be joined by teachers before serving. At this phase, the teacher candidates observe the learning process performed by experienced teachers, and perform teaching practice supervised by guiding teacher, professor from teacher education department, and lecturers. This teaching practice can take 15 to 25% of teachers' entire time in education. Most of the activities are supported by teacher training schools managed by universities, which have curriculum and teaching practice similar with public schools.

b. *Research-based Teaching Profession Development*
In addition, Indonesia can also developing teacher's profession based on research. Education for TST is performed based on combination of research, practice, and reflection. This means the whole process must be supported by scientific knowledge and focus on thinking process, as well as using cognitive skill in researching. TST in Indonesia can commitment in applying research-based teacher education means theories of education, research methodology, and practice play important roles and are used in the program. The curriculum used in teacher education and training program is designed in such a way as to be a basis of education knowledge development and skill development in research methodology. Therefore, every teacher deepens their understanding on the natures of education practice. Teachers who train in Indonnesia also learn to design, perform, and present result of education research, and theoretical aspects of education (Sahlberg, 2011).

Research-based teacher training in Indonnensia has been performed since teacher candidate education and training in universities. Since teacher candidates join training program in university teacher training schools, teachers' researching skill is sharpened and developed. Teacher training school supports and completes education for teachers by involving research process, in which the topics are adjusted with each education discipline. The policy is applied because theory and practice are conceptually inseparable. The integration of practice and theory is important and fundamental to support teacher's autonomy and professionalism. Therefore, applying education theories they have learned on research-based practice is also strongly emphasized (Raiker & Rautiainen, 2016).

Teachers can be trained to support each other in improving their professionalism by collaborative research. Teachers teaching the same subject are strongly encouraged to observe each other to benefit reflective researches such as classroom action research (in Indonesia Penelitian Tindakan Kelas/PTK) and lesson study (LS). Teachers also should be trained to write their research result into scientific paper which is presented at small scale, seminar, and other activities. Not only for in-service teachers, skills related with education research should be trained since education universities so that teachers are used to scientific activities when in-service.

c. TST Integrates Technology in Education and Teaching
One of the challenges due to changes in today's education world is the integration of information and communication technology (ICT) into teacher education. Teacher education in Indonesia is more oriented to research. Moreover, teachers there are used to researching by using ICT (e.g. computer-assisted research). In this case, the teachers are trained to use technology in collecting data, processing information from various sources, and prioritizing the usage of ICT for scientific reasoning. The teachers also encouraged to use ICT to find solution in learning management system, use audio/video technology in teleconferencing, and learning via internet (Meisalo et al., 2010).

Indonesia also keeps encouraging the teachers to grow their skills and mastery of technology in education and learning. For teachers in Indonesia, ICT competency is developed by two innovative ways which are: (1) trying ICT-based learning methods and ICT-based learning methods in teaching activities in classrooms, by class-tutoring or peer-training; and (2) sharing results of using ICT in learning in education festival which is held at regional scale (Petrelius et al. (2016:229). It will be easier for teachers to integrate ICT into learning if their colleagues help. Moreover, sharing experience in teacher association meetings can provide beneficial insight and information based on their experiences.

Furthermore, a number of recommendations are given Meisalo et al. (2010:58) based on research on the usage of ICT in teacher education and training. Some of the recommendations are below.

1) There should be clear indication and description of objectives related to the usage of ICT in learning. It should be understood by teachers in terms of ICT integration in learning activities in classrooms. Teachers also should be instilled by the concept that the usage of ICT can facilitate the achievement of learning objectives in students. Teachers today should be able to use advancement in ICT in facilitating the creation of learning community.

2) ICT must be integrated into all lectures and teaching practices since the education of teacher candidates and other accompanying programs. There should be good planning on the types of ICT to be used, tools to be applied, how to use ICT in learning, etc.

3) The usage of ICT in training also should note research-based aspects such as reflection and collaboration. Therefore, teachers will get in-depth knowledge.

CONCLUSION

Based on the result and discussion, it can be concluded that there are two paths of teaching profession training and development which are professional training and development and career training and development. Teaching profession training and development cover training for various competencies to be mastered by teachers.

Factors influencing the effective of TST in Indonesia include suitability of teachers' qualifications and competencies, mastery of technology in education and learning, presentation of in-service training program, and evaluation technique in use.

To improve the TST model in Indonesia is including high standard recruitment system, research-based professional development, integration of technology into teacher education and professional development, and effective evaluation system.

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TODAY'S DISCUSSION BOARDS: THE GOOD, THE BAD, AND THE UGLY

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ABSTRACT
The aim of this paper was to investigate the Piazza usage trends amongst the Computer Science Engineering (CSE) department at a research-intensive university located in the southwestern part of the United States (US). Results showed that student and instructor interaction with Piazza varied from course to course with contribution data spikes correlating to important assignments or exams. Undergraduate and Graduate interaction with Piazza differed significantly with some slight overlap. Piazza use was much more prevalent amongst undergraduate CSE students. Undergraduate courses had higher average contributions per student and quicker response times. Logon patterns indicated that many students visit the page without contributing and the profile of the patterns were recognizable and consistent across graduate and undergraduate courses. It is good that Piazza provides a great outlet for interaction and problem-solving for students, but there are bad asynchronous forum factors, and unsettlingly ugly issues of student data and privacy. This investigation points to some interesting data trends and warrants further investigation into *why* students behave the way they do with Piazza and what impact this interaction has on their learning and well-being.

INTRODUCTION
Fostering fruitful discussion can contribute significant improvement to learning. Online tools and software for learning outside the classroom have become more prevalent and accessible for use. A primary example of these tools are online discussion boards like Piazza. There are practical applications of analyzing the current usage of online discussion boards: more online classes are being offered and instructors are increasingly incorporating discussion boards, flipping the classroom, and implementing education technology to augment their teaching. For this purpose, student usage data of Piazza was tallied and analyzed to learn more about student behavior and interaction with the online forum. The insight gathered can elucidate ways to enhance student learning, improve piazza and other forums, and introduce more effective ways to teach. All in all, these online communities and outlets for learning will be increasingly present and must be adequately understood.

Discussion boards are by nature, asynchronous; contributions occur at different times. While multiple users may be logged on and observing, posts pour in at different times and in some instances, can mimic real-time conversations (Andresen, 2009). Discussion boards provide an avenue for uninterrupted communication; participants can express their contributions to a discussion or problem-solving stream without worry of being overlooked or unheard due to timidity or reluctance to speak out. This can encourage an inclusive environment

with more contributions to the discussion (Andresen, 2009). Online learning environment is a large factor in the success of asynchronous discussion boards; the classroom culture fostered as well as the actual participants contributing to the content play a large role. Personality, ways of learning, and communication skill shape the learner-to learner interaction and foster the cohesive end-result of discussion (Guldberg & Pilkington, 2006). In this study, we take a look at multiple Piazza courses and seek to ascertain the degree of student interaction with the online forum-- the factors mentioned all contribute to the amount of student usage and contributions.

Effective instructors attempt to create a healthy learning community and a rich environment for collaboration. In mediating discussion, instructor's over-involvement can result in decreased interaction of learners and serve to quell the individual problem solving of the learners as they defer to the instructor for solution and wait for their answer instead of problem-solving themselves (Guldberg & Pilkington, 2007; Paloff & Pratt, 2001). Ideally, instructors should instead seek to mediate and facilitate the problem-solving and discussion present; confirming and clarifying concepts as a result of student-lead discussion. Piazza tracks the contributions of instructors in their course: their usage can provide a snapshot of how an instructor manages their online discussions and what effect it may have on the overall involvement and engagement of the students.

Asynchronous forums are ultimately used to foster a degree of deeper student learning. Research to assess the level of success of asynchronous forums has elucidated some interesting outcomes of employing discussion boards. A correlation of positive grade increase is seen with increased activity in discussion board use as evidenced by number of times a student posted and how many times they accessed the discussion board (Webb et al., 2004). Of course, it must be considered that varying levels of cognitive complexity and engagement are seen amongst different courses. In assessing the level of success in creating higher student learning, Schellens and Valcke (2005; 2006) found asynchronous forums to be more successful in creating pointed discussion for completion of assignments or tasks. The more discussion, the higher knowledge generation, and the higher level of productive, pointed discussion, the higher the phase of knowledge generation. This prior research and thoughts of improved learning through the use of discussion boards points to the importance of beginning to understand how Piazza is being used. Zhu (2006) points to the earlier discussed notion that instructor role plays an important part in the level of student learning achieved as a result of asynchronous discussion board usage. They found that instructor design of discussion board usage led to higher levels of student learning and is more significant than the actual technology employed. There is no blanket, re-usable technique for assessing the degree and quality of student participation in asynchronous discussion forums. There is often a large amount of data to be assessed and they are all separated temporally, making it sometimes difficult to assess, especially on the individual student level (Bali & Ramadan, 2007; Dringus & Ellis, 2005). This paper takes the first steps toward cohesive assessment and elucidation of information available in Piazza.

Traditional asynchronous discussion forums have been seen to have some limitations and ineffectiveness in certain areas. Particularly, asynchronous forums have shown little feasibility for problem-solving based questions in physics and statistics courses (Kortemeyer, 2006; Hong et al., 2003). Conceptual questions are more general and can deviate from a central point and still address the issue, while problem-solving questions are hyper-specific: Am I using the correct formula here? As a result, these questions have a deal of latency in response and involve a degree of indefinite waiting for response. Overall, research points to the extreme importance of the instructor in shaping and dictating the online environment for their asynchronous discussion board; they must serve as a liaison for preparing content to engage students and shy from being overly-active within them.

Several of the aforementioned examples explore the usage of discussion boards generally, this paper will delve into Piazza usage specifically. Piazza (www.Piazza.com) is a popular free online discussion board that was founded in 2009 and used in thousands of courses internationally. The Piazza interface is an open and interactive discussion that resembles a wiki and forum where students can pose questions, engage in peer to peer collaboration, and is noted for its short response time (Blooma 2013; Parker & Canfield, 2013; Qasem, 2012). In this interface, students can create their own interface and faculty are able to access reports on student participation by aggregating the number of contributions, questions asked, and questions answered (Blooma, 2013). In Piazza, students and faculty alike can contribute to virtual classroom interactions, pose questions, and endorse or correct student responses (Minichiello et. al, 2013). While Piazza has been integrated in several different types of coursework, in our setting it is particularly prevalent in large undergraduate computer science and engineering (CSE) courses.

In this study, we discuss the Piazza participation and engagement data amongst CSE students in six classes at a research intensive university located in the southwestern part of the United States (US). Student number of contributions, questions asked, questions answered, questions viewed, and days online are analyzed. In addition,

posts per day and usage trends are analyzed and reported.

LITERATURE REVIEW

Information processing

Information processing (IP) will serve as the theoretical framework to critically evaluate extant literature germane to this study. The IP theory is used to understand how people encode information and create a schema that allows them to shift information from their short term into the long-term memory store.

Information Processing
(Atkinson & Shiffrin, 1971)
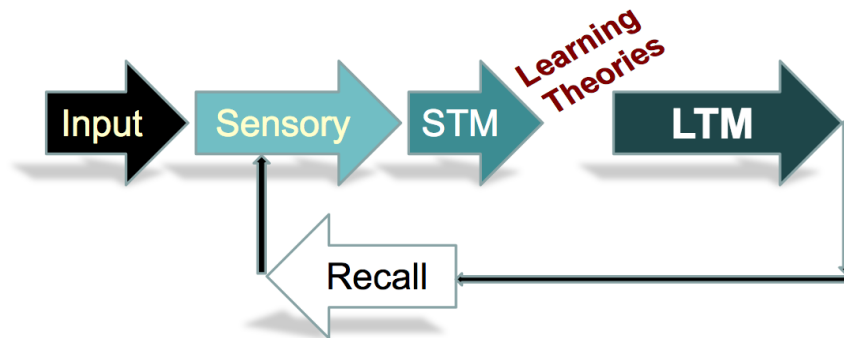
Short term memory, also known as the 'working memory', can be viewed as the first receptor of input. Degradation of information in the short-term memory store occurs after a very short time period and conversely, the long term memory store is where the information resides in a near permanent state.

The structural composition of the IP Theory can be broken down into three distinct categories: The Sensory Register, The Short-Term Store and The Long-Term Store (Atkinson & Shiffrin, 1971). Seminal contributions have been made by Albert Bandura (1977), who suggests that there are four distinct stages that define the memory modeling process: Attention, Retention, Reproduction, and Motivation.

Classroom Culture

It was reported in the literature that for an instructor to create a positive classroom climate, propagating feedback loops allow energy and direction to infuse the learning environment (Bright, Turesky, Putzel, & Stang, 2012). This is supported by a meta-analysis of what students value in the classroom. The findings suggest that 'genuine dialogue' and building 'strong ties' are deeply valued by students, which in turn leads to increased attention, and cultivation of a sense of community within the college classroom (Elliot, 2016). However, negative feedback loops, also known as 'damping feedback', have been shown to impinge upon the students' ability to take risks and engage fully in class (Axley & McMahon, 2006)

Online Communities

By definition, an online community is a group of people with a purpose, working in a virtual environment, who are supported by technology (Preece, 2000). There are several ways to communicate through online mediums and this in turn creates a range of technologies to support online communication. The literature on Piazza reflects some distinct attributes of this platform as an online community in that it is student-focused and driven by student questions (Blooma, 2013; Hwan et. al, 2016). Despite the multitude of technologies aiming to facilitate communication online, there have been relatively few attempts to measure the effectiveness of the structures in place to facilitate discussion (Preece, Maloney-Krichmar, & Abras, 2003).

Discussion Boards

One mechanism to facilitate online learning can be an active discussion board. Discussion boards have been used as communication platform for a group or online community and additionally have the capacity to serve as a means of archiving and searching communication (Slaton, 2001; Harman & Koohang, 2005). Discussion boards can be an integral part of e-learning and have the potential to function as a learning object; they can also function as a supplement to course materials, providing a dynamic syndicated content (Harman & Koohang, 2005). The literature also points to the potential for discussion boards to improve students' learning in higher

education. Integrating discussion board usage is one means of reducing social barriers and has been shown to present improvements in academic performance and building community (Alghamadi, 2013; Covelli, 2017; Vellukunnel, 2017).

In contrast to the literature supporting the integration of discussion boards in classroom instruction, there is also research that points at the insufficiencies of online discussion boards and highlights the potentially negative consequences of relying upon these platforms. More specifically, discussion boards encourage a depersonalized and highly mediated learning environment (Ruberg, Moore, & Taylor, 1996; Thomas, 2002).

Piazza

One discussion board with relatively high functionality for a free discussion board is Piazza (www.Piazza.com). This platform combines a traditional discussion board with wiki functionalities and was developed with the aim of increasing classroom engagement (Koprinska, Stretton, & Yacef, 2015; Piazza, 2015). Additionally, Piazza has been integrated into flipped classrooms (Clark, Kaw, Lou, Scott, & Besterfield-Sacre, 2018).

There is limited research examining the integration of Piazza, but this discussion board is observed to be commonly utilized in Computer Science (CS) programs. In a recent study on Piazza usage in CS courses, the effectiveness for students was examined and a positive relationship was established between active Piazza users and overall course performance (Vellukunnel, 2017; Minnes, Mayberry, Soto, & Hargis, 2017). Piazza has also been found to create an environment that encourages engagements by sometimes marginalized groups, and particularly women in science, technology, engineering and mathematics (STEM) fields (Sankar, Gilmartin & Sobel, 2015). This study strives to build upon the existing literature on discussion boards, fill some of the gaps in the literature on Piazza usage, and present an overview of the trends of Piazza student engagement.

METHODS

The initial criteria for institutions to be included in this study of Piazza usage focused on large, public, research intensive institutions that offer CS coursework, and are on the quarter (not semester) system. These criteria narrowed our study to 11 potential US institutions. We then analyzed the selected 11 institutions and classified them by student enrollments, admissions percentages, and Piazza usage. After this initial analysis, we elected to search for Piazza discussion boards which occured in the winter 2018, fall 2017, and spring 2017 quarter to provide the most recent data set of completed courses. To identify courses, Piazza allows users to view a dropdown list of courses within the given institution and major. This provided us with additional data regarding Piazza presence within a CS department and allowed us to further narrow the list to eight institutions that demonstrated high levels of Piazza usage in CS coursework. At this point in our analysis, issues of access became apparent across the eight selected institutions. When we selected to join a course, it required a university-specific email domain, and as a result were unable to access the course page. This requirement led us to focus the study within our home institution where we had email domain access and therefore access to all Piazza course pages.

Our institution offers computer science engineering (CSE) courses at both the undergraduate and graduate level. This was our context for gathering and illustrating Piazza usage trends. Using the same methods as described above, we identified courses available at our institution: seven CSE courses were available for sign-up in the fall quarter, three in the spring quarter, and 20 in the winter quarter. Piazza courses were identified in the university's dropdown list and added to the account for access via signing up as a student. We initially selected 14 Piazza pages (Appendix A): six undergraduate courses (CSE 1X or CSE 1XX) and eight graduate courses (CSE 2XX) that provide representative Piazza course experience across fall, winter, and spring quarter of the 2017-8. An average of two contributions per student and 50% of students making a contribution were set as minimum student contribution requirements for adding courses for assessment.

Discussed and represented herein (Table 1) are six selected courses reflecting sufficient enrollment numbers, a coverage of all three recent quarter terms, adequate student contribution, and overall Piazza activity. Specifically, the characteristic participation engagement points of average contributions per student and average questions per student were used as a mechanism for choosing one course over another, as more involved courses allowed for more observation of CSE student usage trends. A student enrollment minimum of 100 and a minimum contributions per student of six were deemed as sufficient. Courses were also investigated to see if podcast versions of the lectures were provided. This information was often on the piazza page itself, but podcast availability was confirmed by accessing course syllabi and departmental site and resource pages. Podcasts are serial audio files describing a story. In our case, the story is a set of class lectures. The podcasts (technically Vodcasts, since they include video) are captured and provided to students following each class session through a university secured electronic portal. The presence of this feature in the course was posited to be a potential

contributing factor to the usage of Piazza. In addition to whether or not a course was podcasted, the inclusion of specific requirements of Piazza participation being considered in the grading structure was identified as an important potential contributing factor in the rate of Piazza participation. This incentivization essentially guarantees full usage of the course page and some atypical trends and variables arise. For this reason, only courses without Piazza participation in the grading structure were analyzed (Table 1). Usage patterns amongst classes with grading incentivization are available in Appendix A.

Quantitative usage of Piazza by CSE students at this institution was evaluated. This included Piazza
- course enrollment;
- percent of enrolled students that made a contribution;
- total number of posts;
- total contributions;
- number of instructor/student responses;
- percent of questions receiving instructor/student responses;
- percent of student responses endorsed by the instructor;
- number of student questions; and
- average response time.

Table 1. Piazza participation.

Course Name	Enrollment	Total Posts	Average Contributions per Student	Average Response Time
CSE 255	219	658	13	32 mins
CSE 123	110	394	12	19 mins
CSE 252A	178	407	8	72 mins
CSE 12	316	1645	18	31 mins
CSE 131	162	528	16	17 mins
CSE 250B	319	513	6	104 mins

Once logged into a CSE course, the user is able to access all question and answer posts, class resources and documents, and a summary of usage statistics. Data related to usage trends was collected by navigating to the Statistics tab for each course on Piazza. Summarized usage trends were collected by selecting "View Piazza Report" from the Statistics page. Usage trends were collected for unique users per day and unique posts per day by creating a screen capture of the graphs displayed on the Statistics page. Hovering over the graph shows the value of individual data points. Data points for peak values were collected and analyzed. Data from the posted syllabi for each course was collected either from the course's Piazza website or from the public online directory of CSE courses. Dates corresponding with exams and/or deadlines were collected from these syllabi. After collection of student usage graphs from the Piazza course statistics page, the progression of student engagement with the course over time was analyzed. Specifically, for each course, a peak of student questions asked was identified. Upon recognition of this peak and its corresponding date, a quick investigation of the posts' content during this date was done to ascertain what major assignment(s) or test may be the cause of a spike in the page usage. This date was then confirmed by reading the course syllabus.
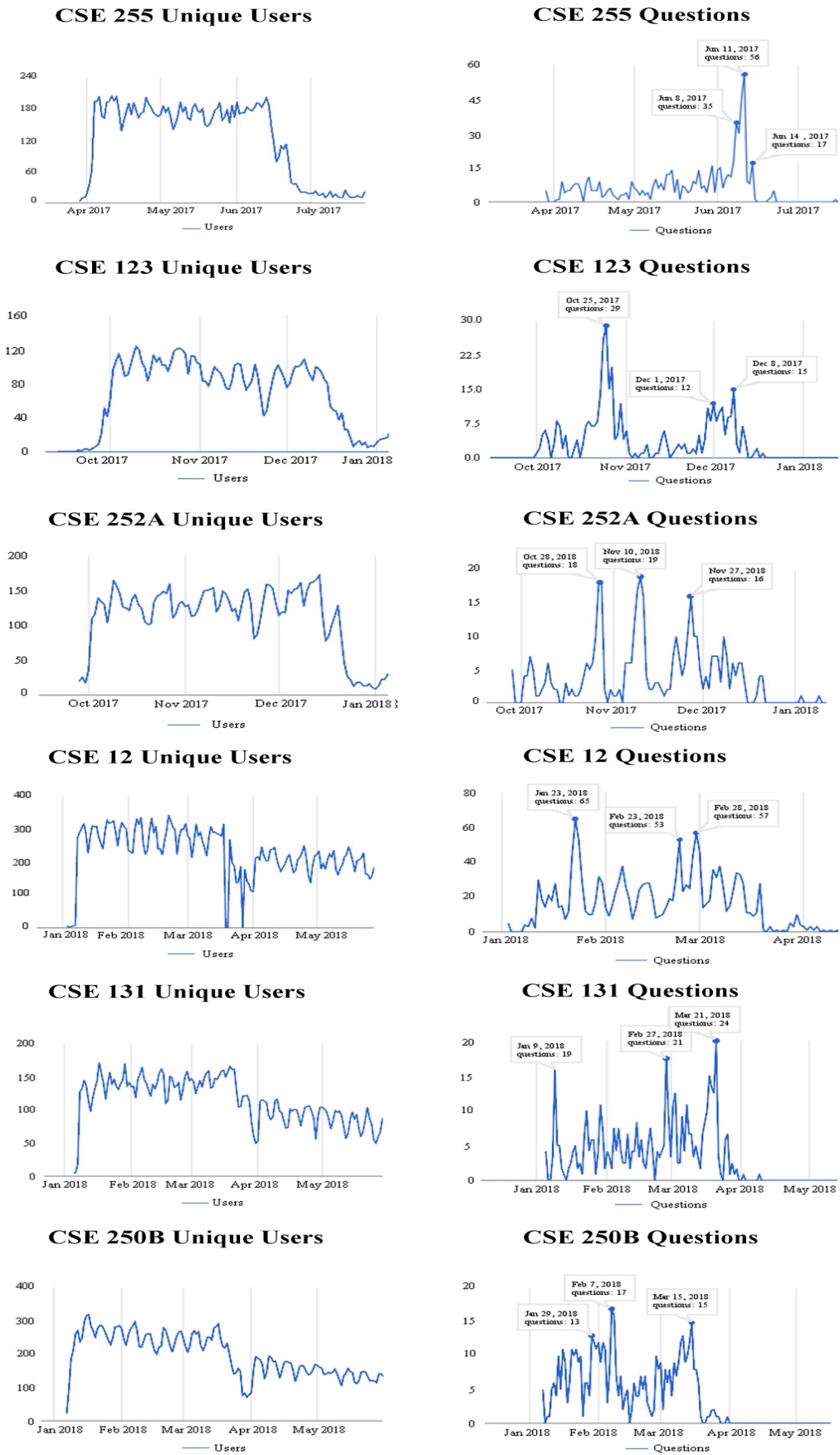
RESULTS

Figure 1. Piazza Usage Plots. Unique users are logs of when an individual student logs on at least once during a

given day. Questions asked for the corresponding courses are shown in the right panel with 3 highest usage dates marked by their date.

DISCUSSION

Use of Piazza amongst students in CSE at a large public research-intensive university in the US operating on the quarter system was investigated (Appendix A). Courses in the spring 2017, fall 2017, and winter 2018, were specifically observed. CSE courses at the institution often involve a series of programming homework assignments, exams, and/or a programming project. By nature, this requires students to answer many programming questions and code their own answers. Critical thinking anchored by knowledge of concepts taught in class and text are necessary to complete the tasks at hand.

Piazza is used in these courses as an avenue for students to ask questions outside the classroom or office-hour periods. Students can directly ask clarifying questions on assignment instructions, due dates, exams, etc. It allows for the students to work together collectively to critically think and problem-solve to tackle a common goal: completing a question or understanding a concept. Because of the nature of these CSE classes where original programming code is required, there are often stipulations or general understanding that source code or other information that would otherwise state the answer is not allowed for posting. Student contributions were observed to generally entail logistical clarifications (tests, HWs, grading, etc.) or content specific problem solving (HW questions, Review questions, etc.). The actual content of these contributions, however, was not the focus of this work, but instead on how Piazza was being used.

Overall, the Piazza courses shown in Appendix A convey a robust use of Piazza in the CSE department at this university. Total course contributions ranged from 1,347 to 5,619 contributions and total posts ranged from 394 to 1,645 posts. Posts include all notes and subsequent comments posted by the students. Piazza contributions entail "posts, responses, edits, follow-ups, and comments to follow-ups" ("Class Statistics"). Question response rate amongst all CSE courses investigated in Table 1 was very high, with an average response rate of 93%. Overall response rate totaled about 93% (Appendix A). Classes vary widely in their method of participation: some courses are driven by instructor responses while others have a majority or responses coming from fellow students. Literature addresses the question of the "role of the instructor" in discussion forums and suggests that they should take a hands-off approach (Andresen, 2009). The data within this CSE department shows that there are multiple instructing approaches in using Piazza. The online learning environment fostered by the instructor and students is a large factor in the success of asynchronous discussion boards and naturally; personality, classroom culture, ways of learning, and communication skill vary from classroom to classroom and student to student (Guldberg & Pilkington, 2006). For this reason, we can expect quite a degree of heterogeneity amongst usage data, but given the subject-matter and institution, some commonalities are seen as well amongst certain courses.

The courses assessed included both undergraduate and graduate courses. Piazza use was much more prevalent amongst undergraduate CSE students. Average contributions per student in the undergraduate courses was about 15 contributions. In the graduate courses there were only an average of nine contributions per student. In addition, graduate student courses only averaged 2.6 questions per student, while undergraduate courses averaged four questions per student. Average response time in undergraduate courses was also less than a third of the response time seen in graduate courses (Appendix A and Table 1).

These trends point to key observations. Undergraduates, on average seem to have a more involved relationship with Piazza, contributing much more often than graduate students. Are graduate students interacting with it less often because of less need or pressure? Or does the structure of assignments differ at a higher level of education?

The questions addressed to this point warrant a deeper investigation of patterns and trends within these contributions observed (Appendix A and Table 1). Specifically, in the undergraduate course, CSE 12, there were three spikes in usage as signified by questions asked (Figure 1). These dates were assessed closely by reading the course Piazza posts during that day and verifying assignment due dates as outlined in the specified course syllabus. Syllabi and course information was accessible without actually being a student enrolled in the in-person course; the Piazza page or the university computer science department website harbored these course details. In the CSE 12 course, Jan 23rd consisted of the most questions with 65. This was a day before their second programming assignment was due; so accordingly, students utilized the piazza page significantly more to complete the assignment and collaborate with others, while also asking the instructor for clarification and guidance on the problems. Similarly, on February 28th, 57 questions were asked the day their sixth programming assignment was due. February 23rd also corresponds with a programming assignment.

In a graduate course, CSE 250B (of similar enrollment to CSE 12, Table 1), The highest usage date fell on February 7th, 2018. 17 questions were asked the day before the course's first midterm, signifying the first test of the entire quarter. The second-most usage of 15 questions asked occurred March 15, 2018; which was attributed to a final exam 2 days afterwards. Finally, January 29th had 13 questions asked two days before their third homework assignment was due.

Students regularly logged on for the undergraduate, CSE 12 course. From January 2018 to March 2018, CSE 12 garnered approximately 210-310 students visiting the site; Piazza dubs each student that logs into the class page at least once that day as a "Unique User." This average shifts in the latter portion of the course from April to May 2018, where the course only garners 130-250 unique users. Another undergraduate course, CSE 131, bears a strikingly similar pattern to this, where students login at a somewhat constant range that dips slightly in the last two months of the quarter but also remains constant. CSE 250B also mimics the pattern of CSE 12 and CSE 131, despite being a graduate course. While this login pattern is the same, actual contributions to the piazza page do not occur similarly amongst undergraduate and graduate courses. CSE 250B has significantly lower questions asked, and the focus of the questions are different. Many questions in higher usage dates were exam focused instead of homework or assignment focused. The highest peaks observed in Figure 1 for the undergraduate courses were almost solely due to homework or project based assignments, while a larger percentage of higher usage dates in graduate courses were attributed to an exam of some sort. Interestingly, CSE 255, CSE 252A and CSE 123 all exhibit a unique users profile that increases sharply at the beginning of the quarter, plateaus throughout the duration, and abruptly decreases to no usage at the end of the course. The consistency of these logon patterns in CSE courses reach across undergraduate and graduate courses.

In relation to this apparent consistency, a compelling observation amongst all courses is the phenomena that peaks in questions asked do not correlate strongly with number or unique users. Students are regularly logging on; but, despite say, 300 students logging on, only 10-60 may ask a question. This suggests that students regularly check the site to see what they've missed or peruse the posts for specified information without contributing to the discussion or problem-solving. Do students check for a purpose? It begs to question, do they logon to complete their assignment or another task, or is it simply a mental necessity to put their mind at ease? This type of log-on-daily attitude is one that brings up an interesting question of what these type of learning communities contribute. What is Piazza's impact on student learning and their emotional experience with it? Do notifications and the simple presence of a page being updated daily cause a sense of uneasiness amongst the students that would otherwise not have used the site to ask a question or contribute to a response? We will attempt to categorize the findings in areas of "Good, Bad and Ugly" below.

Good

In lieu of meet-ups at a library or limited office hours, students have available to them a discussion board where they can ask questions at any time and recruit a group of classmates and instructor(s) to help them learn and problem-solve. Piazza facilitates a litany of outside-classroom interactions that may not happen otherwise. Access to this site provides an opportunity to enhance learning and retention via meaningful interactions within the question and answer based system. Discussion boards provide a unique opportunity of uninterrupted communication and an inclusive education environment. Normally timid or reluctant students can express their contributions without fear (Andresen, 2009).

As mentioned earlier, active Piazza use has been seen to lead to positive overall course performance (Vellukunnel, 2017; Minnes, Mayberry, Soto, & Hargis, 2017). Piazza also can create an inclusive environment that encourages engagement by underrepresented groups (Sankar, Gilmartin & Sobel, 2015). Piazza provides a largely asynchronous style of question and response. This type of discussion forum has been seen to produce a task-oriented environment that results in higher levels of new knowledge (Schellens and Valcke, 2006; Schellens and Valcke, 2005). Piazza also serves as a great tool for instructors to assess student participation. As seen in this paper, student usage patterns and contribution statistics can be analyzed. For instructors, access to a .csv file creates a facile way to see how the classroom is interacting with Piazza. In addition, easy to understand reports and quick-hit information like "top-student contributors" are also available.

Bad

In an asynchronous discussion forum like Piazza, students can ask questions that are instantly responded to or there can be a degree of latency to the response; in some instances, questions may go unanswered. Question response rates seen in Appendix A range from 81% to 100% and average response time varied widely from 17 minutes all the way to 104 minutes. This waiting or non-response can dampen a student's ability or potential to solve a problem.

Also, this format of forum can lead to confusion amongst students-- multiple postings, comments, and contributions can lead to students responding to the wrong post or miss out on key information in problem-solving (Dringus and Ellis, 2005).

While Piazza does provide a litany of statistics and data regarding student usage of the page, there is no blanket way to assess participation with explicit clarity. When incentivized with participation credit, students can opt to post minimum response requirements to get credit and not actually contribute a meaningful post (Palmer et al, 2008). Literature has shown that only a small portion of students are largely responsible for the total number of posts or contributions within a discussion forum (Breslow et al, 2008). Piazza dubs these students as "Top contributors," and their habits can skew what may actually be occurring amongst the majority of the classroom.

Ugly

In the initial investigations of Piazza usage amongst the CSE department at this university, we stumbled upon some unforeseen discussions which caused a proverbial flag to be raised. As outlined in the methods, we were able to navigate to various Piazza courses. Although access was limited to university email domain, once present on the class page you could obtain fairly sensitive information without being enrolled in the actual class. For example, page posts often are tagged with a student's full name unless they choose to classify that post as anonymous. Many in our investigation opted not to post anonymously. Even for the few that did choose this route, the statistics page posts full names of top student contributors to the Piazza page. In every report summary seen in this investigation, full student names were seen. In our case, we poured through this information months after the conclusion of the courses.

On one hand, this points to the ease of which we were able to obtain this information without having to consult with the classes in any way; on the other, it inspires the question of what truly is open source and what does privacy mean?

This line of questioning led us to the subject of student privacy and student data. Piazza Careers has quietly integrated itself into the site, without many knowing what it actually means. Piazza has been a free resource for students, but in 2014 Piazza Careers began, selling student data to interested parties and recruiters. Do students realize what Piazza Careers is? Are they explicitly aware that their data is being sold? Well, Piazza's privacy policy addresses this and students must "opt-in" to the service. But in practice, opting-in involves recognizing an auspiciously pre-checked sign-up box upon the initial setup of your Piazza account. This issue is at least eye-raising and has been covered extensively and completely elsewhere (Hill, 2016a; Hill, 2016b).

LIMITATIONS

Statistical analysis proved difficult due to the requirement of signing up as a student. If you sign-up for a Piazza course as an instructor or TA, you are given access to a .csv file when you navigate to the statistics page of the course. This gives tabular entries of student contribution statistics, which facilitates facile processing for statistical analysis of both individual student and course averages. Piazza provides a smaller amount of statistical analysis accessible through student log-in; that data is represented herein. Future studies may be aided by access of the site with special TA or instructor as afforded by the course professor. There is much to be said about the sheer amount of data accessible without this step.

As mentioned in the methods section, we were limited to analyzing courses which were available to us in the sign-up process. 30 total Piazza courses were available at our institution, but the distribution of the courses was not balanced; notably, the spring 2017 quarter only had three total courses available to pull data from. Two of these spring 2017 courses had very low enrollment of 16 and 28 students. This comparative lack of representation for this quarter effectively limits the overall balance of the data across all three quarters (Appendix A).

CONCLUSION

This paper provides a characterization of Piazza usage amongst CSE students whilst also stumbling upon the Good, Bad, and Ugly of Piazza and asynchronous discussion boards as a whole amidst overarching themes of data access and privacy. The statistics freely accessed in this investigation point to robust piazza usage at this university and can serve as a reference point or indicator for instructors teaching within similar departments or fields on how their students may interact with their online discussion boards.

The issues and concerns raised about Piazza Career services warrants a consideration of the universities and institutions which use the site. What should we/they do about this? We suggest that students and instructors are

educated before use by the university. This could serve to coach students on how to opt-out of sharing their student data if desired and enhance the transparency on what seems to be an easily overlooked component.

The student Piazza usage results illustrated some intriguing trends within individual courses and revealed differences and similarities between undergraduates and graduate courses. Future studies warrant further investigation into *why* students behave the way they do with Piazza and what impact this interaction has on their learning and well-being. In addition, observation of CSE students within a semester system would prove useful for comparison and serve as an indicator for what dictates usage of Piazza.

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APPENDIX A.

Master Table of Piazza participation.

Course Name	Course Name	Quarter	Podcasted?	Piazza Participation Credit?	Usage Class (Low, Med. High)	Enrollment	% to make contribution	Total Posts	Total Contributions	Average Contributions per Student	Instructor Responses	% of questions receiving Instructor response	Student Responses	% of questions receiving Student response	% of student responses endorsed by instructor	Student Questions	Average Questions per Student	Question Response Rate	Average Response Time
CSE 216	Interaction Design Research	Spring 2017	N	Y	Low	28	100%	104	234	**9**	41	63%	16	21%	8%	62	**3**	81%	**42 mins**
CSE 255	Big Data Analytics Using Spark	Spring 2017	N	N	High	219	76%	658	2773	**13**	187	30%	796	66%	34%	581	**3**	81%	**32 mins**
CSE 291	Embedded Image Processing	Spring 2017	Y	N	Low	16	56%	36	60	**4**	9	73%	1	9%	0%	11	**1**	82%	**N/A**
CSE 123	Computer Networks	Fall 2017	N	N	Med	110	82%	394	1314	**12**	390	93%	79	17%	33%	337	**4**	99%	**19 mins**
CSE 210	Principles of Software Engineering	Fall 2017	N	N	Low	37	76%	177	378	**11**	80	100%	6	8%	33%	79	**3**	100%	**78 mins**
CS	Com	Fa	Y	N	M	178	69	4	134	**8**	30	76	13	27	23	36	**3**	95	**72**

E 252A	puter Vision I	ll 2017			ed		%	07	7		4	%	1	%	%	2		%	**mins**
CSE 12	Basic Data Structures and Object-Oriented Design	Winter 2018	Y	N	High	316	87%	1645	5619	**18**	1385	78%	542	27%	11%	1491	**5**	97%	**31 mins**
CSE 110	Software Engineering	Winter 2018	Y	Y	High	197	99%	866	3441	**18**	597	90%	186	23%	26%	601	**4**	100%	**36 mins**
CSE 131	Compilers	Winter 2018	Y	N	High	162	87%	528	2431	**16**	312	50%	510	56%	21%	462	**3**	95%	**17 mins**
CSE 190 A00/ B00	Successful Entrepreneurship	Winter 2018	N	N	Med	112	56%	150	338	**4**	77	88%	6	7%	33%	84	**1**	94%	**60 mins**
CSE 190 D00	Statistical NLP	Winter 2018	N	Y	Med	106	73%	249	1030	**10**	173	73%	162	64%	29%	21	**2**	100%	**54 mins**
CSE 202	Algorithm Design and Analysis	Winter 2018	N	N	Med	97	64%	189	498	**6**	146	78%	30	14%	29%	169	**2**	88%	**31 mins**
CSE 222A	Computer Communication Networks	Winter 2018	N	N	Low	27	67%	33	69	**3**	13	80%	2	13%	0%	15	**1**	93%	**49 mins**
CS	Mach	W	N	N	H	319	59	5	183	**6**	37	67	28	39	27	47	**2**	93	**10**

E 25 0B	ine Learn ing	int er 20 18			ig h		%	1 3	2		4	%	9	%	%	6		%	**4 mi ns**

WALKING THE WALK OR JUST ALL TALK? COLLEGE FACULTY AND STUDENTS' PERCEPTIONS OF UNIVERSAL DESIGN FOR LEARNING IN THE CLASSROOM

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ABSTRACT

Universal Design (UD) is an effective, flexible blueprint that focuses on differences as they relate to learning; because learners differ in the ways they see and understand information that is presented to them, students from various socio-economic, cultural, and learning differences need different ways of approaching content. Extant research has largely explored attitudes related to UD from a faculty or student perspective, this exploratory case study employs quantitative research methods to explore perceptions of UD among faculty and the students they teach at a mid-sized regional public university.

Using a quantitative, causal comparative framework, findings indicate student *and* faculty agreement with statements about the importance of UD strategies/practices is overwhelmingly higher than respondents' agreement with statements about the implementation of those strategies/practices in their classrooms. This difference was statistically significant across all items for students; faculty perceived the gap to be a lot more narrow.

Findings highlight the challenges that still face faculty and students, and the academy. Benefits to students of expanded professional development opportunities for faculty to support the changing needs of diverse learners are identified, and practical UD applications in the college-classroom are presented.

Keywords: Universal design, universal design for assessment, universal design for learning, universal design for instruction, students with disabilities, professional development, disability in higher education, scholarship of teaching and learning.

INTRODUCTION

Student success depends on increasingly sophisticated teaching and learning skills to meet a rapidly changing student body. Universal Design (UD) is an effective, flexible blueprint based on neuroscience that focuses on differences as they relate to learning (CAST, 2014). Student success depends on increasingly sophisticated teaching and learning skills and UD creates decentralized practices, resulting in new contexts and styles of instruction that can be valuable for all students, particularly those with disabilities.

In recent years, students with disabilities have emerged as a growing higher education sub-group in both the United States of America and overseas (A. Lombardi, Vukovic, & Sala-Bars, 2015). The U.S. Department of Education National Center for Education Statistics found that 2,563,000 million undergraduate students (11.1 per cent) in the 2011–12 time period reported having a disability (Snyder, de Brey, & Dillow, 2016). Data also indicates that virtually all public 2-year and 4-year institutions reported enrolling students with disabilities; the majority of whom reported having specific learning disabilities (31 per cent), attention deficit hyperactivity disorder (18 percent), mental health/psychological disabilities (15 percent), health impairments/conditions (11 percent), and mobility/orthopedic impairments (7 percent).

Students with disabilities are protected by state, federal, and local laws prohibiting discrimination and requiring equal levels of access to academic services, environments, and resources. One key piece of legislation that provides disabled students with equal benefits, services, and opportunities is Section 504 of the Rehabilitation Act of 1973 which states that "no qualified individual with a disability in the United States shall be excluded from, denied the benefits of, or be subjected to discrimination under any program or activity that receives federal financial service." (R. Act, 1973). Another important piece of legislation that applies to students with

disabilities is The Americans with Disabilities Act, which defines an individual with a disability as a person with a physical or mental impairment that substantially limits one or more major life activities, a person who has a history or record of such impairment, or a person perceived by others as having such impairment. The Act prohibits discrimination on the basis of disabilities in employment, public services, privately operated public accommodations, services, and telecommunications (D. Act, 2008). Both of these legislative provisions guarantee accommodations to students who self identify with verified disabilities. The most common accommodations that are provided in a post-secondary context include: additional exam time, classroom note-takers, faculty-provided written course notes or assignments, help with learning strategies or study skills, and alternative exam formats (Raue & Lewis, 2011).

However, despite robust legislation aimed at supporting and protecting students with disabilities, barriers do hinder implementation of UD in the post-secondary environment. For students, research indicates that many lack necessary knowledge (and self-advocacy) to attain accommodations they are entitled to (Fleming, Plotner, & Oertle, 2017); for faculty, negative attitudes and misconceptions are often coupled with limited staff resources to provide faculty and staff training on accessibility issues (Raue & Lewis, 2011). This is problematic given that research indicates that students with disabilities are more likely to achieve their full educational potential when both students and faculty are well-informed about disabilities and the positive impact of appropriate accommodations (Leyser, Vogel, Wyland, & Brulle, 1998).

In the next section of this paper, a review of literature defines and examines universal design in the context of learning, and explores faculty and student attitudes toward disability in a college classroom context. Next, the researchers outline the survey methodology employed, describe results, discuss implications of the findings, and outline practical UD strategies that can be utilized in the college classroom.

LITERATURE REVIEW
Universal Design
Universal design (UD) is a framework that was originally derived in the 1950s by architectural and environmental designers eager to create opportunities for enhanced access for individuals with disabilities (M. King-Sears, 2009; A. R. Lombardi, Murray, & Gerdes, 2011; Roberts, Park, Brown, & Cook, 2011). The concept of UD evolved further in the 1970s, heavily influenced by legislation mandating civil rights for individuals with disabilities, and ultimately evolved into an effort to make postsecondary education more accessible to students with disabilities through curriculum development. The major frameworks of UD intend to provide flexibility and support to the greatest number of learners via a proactive approach to instruction design (P. King-Sears, 2014). This application of the basic concepts of UD - integration and accessibility - to all people in all environments ultimately evolved into a number of interchangeable perspectives (and acronyms), including: Universal Design for Assessment (*UDA*) (Ketterlin-Geller, 2005); Universal Design for Instruction (*UDI*) (Scott, Mcguire, & Shaw, 2003); and Universal Design for Learning (*UDL*) (A. R. Lombardi, et al., 2011; Orr & Hammig, 2009).

While the underlying principles of each framework may vary, UDA, UDI and UDL share five common themes: (1) *backward design* or the formulation of learning goals and objectives that are stated clearly from the beginning (e.g., on the course syllabus) and mapped to all course assignments and requirements; (2) *multiple means of presentation*, or flexibly presenting content (e.g., providing course materials in digital and print formats) to reduce instructional barriers; (3) *inclusive teaching strategies and learner supports* or specific lecture strategies that aid comprehension (e.g., summarizing key points periodically) and other classroom strategies (e.g., small group work, scaffolding); (4) *inclusive assessment* or varied assessment techniques that are closely mapped to course objectives, and allow students to use combinations of writing, speaking, and other activities to demonstrate mastery of knowledge; and (5) *instructor approachability and empathy* or allowing multiple options for engagement and, if necessary, helping students seek out additional resources available on campus (A. R. Lombardi, et al., 2011; Orr & Hammig, 2009).

Universal Design (UD) frameworks seek opportunities to improve and optimize teaching and learning for all people, to promote maximum usability and accessibility in the planning, delivery, and evaluation stages of instruction (A. R. Lombardi, et al., 2011). UD research focuses on the disconnect between an increasingly diverse student population and a "one-size-fits-all" curriculum which creates barriers to desired gains in academic achievement (Rose & Meyer, 2002), which according to Edyburn (2005), effectively focuses research, development, and educational practice on understanding accessibility and diversity. According to Dinmore (2014), the framework also has the potential to boost teacher-student interaction, increase retention and engagement, and potentially removes roadblocks to learning for all students.

Disability: Student Attitudes and Challenges
Federal data indicates that only a third of students with disabilities who enroll in four-year programs graduate within eight years; that number is as high as 41 per cent in two-year schools (Newman, et al., 2011). When compared with the mainstream cohort, students with disabilities are also at higher risk of poor academic performance, and early departure from college; they also demonstrate higher levels of emotional or psychological distress (Smedema & Tansey, 2015).

Unlike their experiences at secondary level, students with disabilities are required to self-identify to the college/university in order to access accommodations and supports. Newman, Wagner, Cameto, and Knokey (2009) found that only about 40 per cent of college students who received special education services seek accommodations in higher education.

Students decide for varying reasons not to self-disclose (Getzel & Thoma, 2008). Hart, Grigal, and Weir (2010) argue that many are poorly equipped to request and negotiate accommodations at the postsecondary level due to a lack of opportunity to practice these self-advocacy skills in high school where services were often automatically provided; students with disabilities also resist requesting accommodations due to poor societal perceptions of people with disabilities (May & Stone, 2010); Denhart argues students feel that they are cheating by requesting accommodations, while Smart (2001) suggest they may fear the stigma associated with their disability. This issue is exacerbated if the disability is not visible – as in the case of psychological or psychiatric disabilities such as anxiety or depression. These reasons, according to Barnard-Brak et al (2010), are among a myriad of reasons why college students with disabilities don't receive the accommodations they are legally entitled to.

Factors that can have a positive impact on student outcomes are linked to levels of student understanding of the disability, how it impacts their academic performance (self-awareness), and knowledge of how to request accommodations (self-advocacy) (Fleming, et al., 2017). In addition, seeking disability support services, forming relationships with faculty and instructors, developing an on-campus support system, and gaining awareness and self-understanding of needs have also been linked to student needs being met in a college environment (Getzel & Thoma, 2008). College students with disabilities report feeling most successful when faculty set clear, consistent expectations, and content that is delivered clearly and at an understandable level. Students also reported benefiting from outlines of notes, pause and question procedures during lectures, reading guides, and study guides (Madaus, Scott, & McGuire, 2003). Inclusive instruction, which provides a more holistic approach to the design of materials and instructional methods, also has the potential to reduce barriers, and increase student participation and success without extensive accommodations (Gawronski, Kuk, & Lombardi, 2016) (Rose, Meyer, & Hitchcock, 2005) (CAST, 2018). Hall, Strangman, and Meyer (2003) encourage the use of digital materials, which they argue are inherently flexible and customizable to individual student needs.

Disability: Faculty Attitudes and Challenges
Without doubt, the growing population of students requesting accommodations creates challenges for college faculty and their students (Jensen, McCrary, Krampe, & Cooper, 2004). An essential element of student persistence in college is the ability to develop meaningful student-faculty relationships (Astin, 1993; Tinto, 1993). Research indicates that, for the most part, faculty members are willing to provide accommodations for students with learning disabilities (Leyser, et al., 1998), but are challenged by perceptions that accommodations impact the academic integrity of courses, programs, and the institution (Bourke, Strehorn, & Silver, 2000).

LaRocco and Wilken (2013) found that while faculty members acknowledge the challenges faced by students with disabilities in the college/university setting, they were focused more on how pedagogical changes would affect them personally (i.e., requirements concerning effort, time commitment, and skill development) and a strong desire by faculty to maintain a long-standing status quo (Pliner & Johnson, 2004). Fichten, Goodrick, Tagalakis, and Amsel (1990) found that professors prefer students who approach them and initiate dialogue, but that students frequently only approach professors for assistance as a last resort.

Other research found that faculty overwhelmingly reported that they did not implement inclusive instruction in their classes, most likely due to a lack of relevant campus-wide professional development initiatives to provide faculty with training or information about UD (LaRocco & Wilken, 2013). Professional development is proven to be most effective, according to Knowles, Holton III, and Swanson (2011), when it is focused on curricular and instructional strategies that are needed to teach all students. While faculty positively endorse aspects of inclusive instruction, many are not implementing related strategies in the classroom; faculty reported being unaware that students with disabilities are even enrolled in their classes, and many receive virtually no training

in practices that would benefit students with disabilities (Gawronski, et al., 2016; A. Lombardi, et al., 2015; A. R. Lombardi, et al., 2011). Research indicates that faculty lack experience teaching students with disabilities, are unfamiliar with disability rights laws and campus services for students with disabilities, and how to properly implement accommodations (Baggett, 1994; Cawthon & Cole, 2010; Thompson, Bethea, & Turner, 1997). Female faculty were more likely than their male counterparts to accommodate students with disabilities, and tenure-track faculty appeared to be less accommodating and less willing than non-tenure-track faculty (A. R. Lombardi, et al. (2011). Gawronski, et al. (2016) found that age and ethnicity did not make a significant difference in predicting faculty attitudes toward inclusive instruction.

Vega and Tayler (2005) argue that the role of faculty has shifted, that they are no longer merely responsible for ensuring a student learns the material; rather, their role is to facilitate students' interpretation of the information. Pliner and Johnson (2004) argue the UD framework encourages faculty to think more broadly about "what they teach; why they teach it; and, why and how they assess student learning" (p. 107).

College faculty and students are undoubtedly operating in more competitive and dynamic environments than ever before; it is therefore critical to identify and eliminate potential barriers to learning and student success, particularly those with disabilities. Expanding knowledge of both groups' perceptions of UD strategies in the classroom will potentially benefit all parties. Extant research has largely explored attitudes toward UD from either a faculty *or* student perspective, this exploratory case study employs quantitative research methods to explore perceptions of UD among faculty and students they are currently teaching.

RESEARCH QUESTIONS
RQ1.
    (a) What are faculty attitudes toward with UD principles and practices in the classroom?
    (b) What are faculty actions regarding UD principles and practices in the classroom?
    (c) Is there a difference between faculty attitudes and actions regarding UD principles and practices in the classroom?

RQ2.
    (a) What are students' attitudes toward UD principles and practices in the classroom?
    (b) What are students' perceptions of faculty actions regarding UD principles and practices in the classroom?
    (c) Is there a difference between students' attitudes and their perceptions of faculty actions regarding UD principles and practices in the classroom?

RQ3.
    (a) Is there a difference between faculty and students' attitudes toward UD principles and practices in the classroom?
    (b) Is there a difference between faculty and students' perception of faculty actions regarding UD principles and practices in the classroom?

METHODOLOGY
Survey Instrument
The survey instrument used in this study has preliminary convergent validity because it uses many of the same constructs presented in an Inclusive Teaching Strategies Inventory (ITSI) self-report survey that measures respondent attitudes and actions with regard to academic accommodations and inclusive learning environments (Gawronski, et al., 2016; A. R. Lombardi, et al., 2011). Gawronski, et al. (2016) and A. R. Lombardi, et al. (2011) assert that the ITSI is the only survey known to incorporate principles from the major UD frameworks.

One questionnaire was sent to faculty (ITSI), another adapted student version (ITSI-S) was sent to students. The validity of the attitude subscales is confirmed in A. R. Lombardi, et al. (2011). The inventory measures six constructs regarding inclusive instructional practices based on the tenets of Universal Design across several frameworks. The constructs are: (i) Accommodations, (ii) Accessible Course Materials, (iii) Course Modifications, (iv) Inclusive Lecture Strategies, (v) Inclusive Classroom, and (vi) Inclusive Assessment (A. R. Lombardi, et al., 2011). For the current study, the ITSI and ITSI-S instruments were abbreviated from 31 questions to 18 to maximize completion likelihood; the Cronbach's α score for the instrument used in this study was >0.9, which demonstrates acceptable internal reliability.

IRB approval was secured prior to administering the survey; the questionnaire was pre-tested with a small sample of faculty and students to verify the categorical representation, and assess validity and comprehension. All students and faculty in the Communication Studies Department at a mid-sized, public Northeastern regional university were invited to participate in the survey.

The surveys were each comprised of four sections. The first gathered relevant demographic data from both groups of respondents, the second and third sections asked both respondent groups (faculty and students) to indicate agreement or disagreement to statements adapted from the aforementioned ITSI(S) inventory using a 6-point Likert scale; 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree, 6= Don't Know.

As previously mentioned, the current study used an adapted version of a previous study by A. R. Lombardi, et al. (2011) utilizing the same subscales with fewer questions. The first subscale, *Multiple Means of Presentation*, contained items related to presentation of course content with a particular emphasis on flexibility, use of technology, and various instructional formats (e.g., small group work, peer-assisted learning, and hand-on activities). The second subscale, *Inclusive Lecture Strategies*, contains items that measure teaching strategies specific to a typical postsecondary lecture-style class format, including simple strategies faculty may use to assess student comprehension such as repeating student questions to the class before answering and periodically summarizing key points throughout the lecture. The third subscale, *Accommodations*, contains items relevant to specific accommodation requests from students. The fourth subscale, *Campus Resources*, contains items relevant to awareness and use of the Disability Services office personnel and distributed resources (e.g., website and e-newsletters). The fifth subscale, *Inclusive Assessment*, includes items pertaining to flexible response options on exams, nontraditional exams, and flexibility with deadlines. Finally, the sixth subscale, *Accessible Course Materials*, includes items pertaining to the use of a course website and submission of course assignments through online formats.

The final section of the survey asked respondents to answer one open-ended question seeking additional insights not covered in the survey. The convenience nature of the survey and small sample sizes mean that external validity for the survey is low; therefore, only face validity can be assumed.

Participants

In April of the spring 2017 semester, a *Qualtrics* survey link was circulated via email to all Communication Studies students and faculty at a mid-sized, public Northeastern regional university (faculty n=35; student n=473). An initial solicitation email with web-link to the survey was distributed, and one reminder email yielded 76 completed student surveys (n=76; response rate = 16 per cent) and 21 faculty surveys (n=21; response rate = 60 per cent).

Operationalization of the survey

Faculty:

Faculty respondents were first asked a series of demographic questions related to gender, age, race, level of education, rank, teaching experience, type of classes taught (face-to-face/online). In the next section of the survey, faculty were asked to indicate agreement/disagreement with a series of statements related to attitudes toward various UD accommodations/strategies. Items were measured on a 6-point scale preceded by the statement: The following statements explore your attitudes toward various UD accommodations/strategies. Please rate the following statements: "*I believe it's important to...*"

In the next section, faculty were asked to indicate agreement/disagreement with a series of statements related to UD accommodations/strategies they implement in the classroom. Items were measured on a 6-point scale preceded by the statement: The following statements explore the UD accommodations/strategies you implement in the classroom. Please rate the following statements: "*As an Instructor, I...*"

Students:

Student respondents answered questions related to gender, age, race, class year, if they have a disability (and if they indicate they do – if they registered with the university's Office of Disability Services and the nature of the disability). In the next section of the survey, students were asked to indicate agreement/disagreement with a series of statements related to attitudes toward various UD accommodations/strategies. Items were measured on a 6-point scale preceded by the statement: The following statements explore your attitudes toward various UD accommodations/strategies. Please rate the following statements: "*I believe it's important to...*"

In the next section, students were asked to indicate agreement/disagreement with a series of statements related to UD accommodations/strategies their COMM instructors implement in the classroom. Items were measured on a 6-point scale preceded by the statement: The following statements explore the UD accommodations/strategies your Instructors typically implement in the classroom. Please rate the following statements about faculty action in the classroom: "*My Communication Studies Instructor(s) do...*"

Data Analysis
Data were analyzed using IBM SPSS 24 for Windows. A p≤0.05 significance level was used for all statistical tests. A series of non-parametric Wilcoxon signed ranks test and Mann-Whitney U-tests were conducted to inform research questions.

FINDINGS AND ANALYSIS
Description Of Respondents
Faculty
Of the 21 respondents participating in the study, 62 per cent (n = 13) were female and 39 per cent (n = 8) were male. The median age of student respondents was 48 old. The majority of faculty are Caucasian, (85 per cent; N=41), and have a master's (52 per cent; N = 11) or doctoral degree (48 per cent; N = 10). With regard to teaching experience, 33 per cent (n = 7) are tenure-track assistant professors, 33 per cent are part-time instructors (n = 7), 3 per cent are full-time instructors (n = 3), and 4 per cent are either associate (n = 2) or full professors (n = 2). The median amount of teaching experience was 10 years. The majority of faculty respondents teach three face-to-face classes per semester, (38 per cent; N=8), 33 per cent teach two classes (n=41), 24 per cent teach four classes (n=5). Twenty-nine per cent of faculty teach two online classes, (n=6), 33 per cent teach two online classes (n=41), 48 per cent do not teach online classes (n=10). Statistical analysis indicated an absence of statistically significant differences between the two respondent groups in relation to demographic items.

Students
Of the 76 respondents participating in the study, 83 per cent (n = 63) were female and 17 per cent (n = 13) were male. The median age of student respondents was 21 years old. The majority of students are Caucasian, (78 per cent; n=60), and juniors (41 per cent; n = 31) or seniors (40 per cent; n = 30). Eighty-four per cent indicated that they do not have a disability (n = 64); of the 16 per cent (n= 12) who indicated they do, 44 per cent (n=7) have registered with the university's office of disability services. The majority (25 per cent) of students indicated that they have a learning disability (n=5, 25 per cent), psychiatric disorders (n=4, 25 per cent), or Attention Deficit Hyperactivity Disorder (n=4, 20 per cent). The remaining students indicated other disability types, including physical (n=3, 15 per cent).

RQ 1: What are *faculty* attitudes toward UD and the implementation of UD principles and practices in the classroom? Is there a statistically significant difference in *faculty* attitudes toward UD and the implementation of principles and practices in their classrooms?
Faculty agreement to statements about the importance of UD was higher than their agreement with statements about their implementation of the items in their classrooms for all but one of the items - *allow flexibility with assignment deadlines in my course(s) for ANY student who expresses a need* (faculty attitude mean=3.38, faculty action mean=3.57, difference in means=-0.19). See Table 1.

Table 1: Faculty Attitude and Implementation

	Faculty Attitude Mean	Faculty Action Mean	Difference in Means	Wilcoxon Z score	P value
Allow students to express comprehension in multiple ways.	4.62	4.57	0.05	-0.577	0.564
Allow students to demonstrate their knowledge and skills in ways other than traditional tests and exams (e.g. written essays, portfolios, journals).	4.62	4.52	0.1	-0.632	0.527
Allow flexibility with assignment deadlines in my course(s) for ANY student who expresses a need.	3.38	3.57	-0.19	-1.134	0.257
Allow flexible response options on exams (e.g., change from written to oral) for ANY student who expresses a need.	3.71	3.48	0.23	-0.676	0.499
Post electronic versions of course handouts.	4.86	4.71	0.15	-0.905	0.366
Use a course website (e.g. Blackboard or faculty web page).	4.86	4.71	0.15	-0.707	0.480

Post lecture notes online (on Blackboard or another website) for ALL students.	3.71	3.43	0.28	-1.403	0.161
Allow students flexibility in how they submit assignments electronically (e.g. mail attachment, digital drop box).	2.76	2.76	0.0	-1.175	0.861
Connect key points with larger course objectives during class sessions.	4.67	4.33	0.34	-2.11	0.035*
Summarize key points throughout each class session.	4.62	4.38	0.24	-1.667	0.096
Begin each class session with an outline/agenda of the topics that will be covered.	4.43	4.14	0.29	-1.403	0.161
Repeat the question back to the class before answering when a question is asked during a class session.	4.24	3.52	0.72	-2.506	0.012*
Create multiple opportunities for engagement.	4.76	4.43	0.33	-1.611	0.107
Use a variety of instructional formats in addition to lecture, such as small groups, peer assisted learning, and hands-on activities.	4.86	4.86	0	1	0.000
Use technology so that my course material can be available in a variety of formats (e.g. podcast of lecture available for download, course readings available as mp3 files).	3.62	3.00	0.62	-2.437	.015*
Survey my classroom in advance to anticipate any physical barriers.	4.10	3.38	0.72	-2.223	0.026*
Supplement class sessions and reading assignments with visual aids (e.g. photographs, videos, diagrams, interactive simulations).	4.43	4.10	0.33	-1.611	0.107
Use interactive technology to facilitate class communication and participation (e.g. Discussion Board).	3.95	3.75	0.2	-0.711	0.477

* Significance P>=0.05

Using a non-parametric statistical measure – the Wilcoxon signed ranks hypothesis test – the researchers found that there was a statistically significant difference between faculty attitudes toward the importance of strategies compared with the implementation of these strategies in their classrooms in relation to four of the 18 inventory items (22 percent) (see Table 1). The four items that were statistically different were: connect key points with larger course objectives during class sessions ($z = -2.00$; $p = 0.035$); repeat the question back to the class before answering when a question is asked during a class session ($z = -2.506$; $p = 0.012$); use technology so that my course material can be available in a variety of formats (e.g. podcast of lecture available for download, course readings available as mp3 files) ($z = -2.437$; $p = 0.015$); and survey my classroom in advance to anticipate any physical barriers ($z = -2.223$; $p = 0.026$).

RQ2: What are *student* attitudes toward and the implementation of principles and practices in the classroom? Is there a statistically significant difference in *student* attitudes toward and the implementation of principles and practices in their classrooms?

Student agreement to statements about the importance of UD was higher than their agreement with statements about the implementation of the items in their classrooms for all items (see Table 2).

Table 2: Student Attitude and Implementation

	Student Attitude Mean	Student Action Mean	Difference in Means	Wilcoxon Z score	P value
Allow students to express comprehension in multiple ways.	4.51	3.81	0.70	-4.445	0.000
Allow students to demonstrate their knowledge and skills in ways other than traditional tests and exams (e.g. written essays, portfolios, journals).	4.49	3.61	0.88	-4.983	0.000
Allow flexibility with assignment deadlines in my course(s) for ANY student who expresses a need.	4.0	3.07	0.93	-4.703	0.000
Allow flexible response options on exams (e.g., change from written to oral) for ANY student who expresses a need.	4.07	2.91	1.16	-5.126	0.000
Post electronic versions of course handouts.	4.48	3.82	0.66	-4.267	0.000
Use a course website (e.g. Blackboard or faculty web page).	4.52	4.26	0.26	-2.131	0.033
Post lecture notes online (on Blackboard or another website) for ALL students.	4.52	3.73	0.79	-4.862	0.000
Allow students flexibility in how they submit assignments electronically (e.g. mail attachment, digital drop box).	3.74	3.13	0.61	-3.261	0.001
Connect key points with larger course objectives during class sessions.	4.32	3.88	0.44	-3.030	0.002
Summarize key points throughout each class session.	4.53	3.78	0.75	-4.906	0.000
Begin each class session with an outline/agenda of the topics that will be covered.	4.04	3.43	0.61	-4.007	0.000
Repeat the question back to the class before answering when a question is asked during a class session.	4.10	3.36	0.74	-4.837	0.00
Create multiple opportunities for engagement.	4.51	3.89	0.62	-3.977	0.00
Use a variety of instructional formats in addition to lecture, such as small groups, peer assisted learning, and hands-on activities.	4.38	3.90	0.48	-3.691	0.000
Use technology so that my course material can be available in a variety of formats (e.g. podcast of lecture available for download, course readings available as mp3 files).	4.25	3.46	0.79	-4.585	0.000
Survey my classroom in advance to anticipate any physical barriers.	4.04	3.20	0.84	-4.484	0.000
Supplement class sessions and reading assignments with visual aids (e.g. photographs, videos, diagrams,	4.3	3.67	0.63	-4.577	0.000

interactive simulations).					
Use interactive technology to facilitate class communication and participation (e.g. Discussion Board).	4.04	3.75	0.29	-2.121	0.34

* Significance P>=0.05

Using a non-parametric statistical measure – the Wilcoxon signed ranks hypothesis test – the researchers found that there was a statistically significant difference between student attitudes toward the importance of strategies compared with the implementation of these strategies in their classrooms in relation to all 18 inventory items (see Table 2).

RQ3:
(a) Is there a statistically significant difference between *faculty and students' attitudes* toward principles and practices in the classroom?

Using a non-parametric statistical measure – the Mann-Whitney U test – there was a statistically different response between the two respondent groups in relation to the importance of strategies for 5 of the 18 inventory items (28 per cent) (see Table 3). The five items that were statistically different were: allow flexibility with assignment deadlines in my course(s) for ANY student who expresses a need ($z = -2.163$; $p = 0.031$); post lecture notes online (on Blackboard or another website) for ALL students ($z = -2.397$; $p = 0.017$); allow students flexibility in how they submit assignments electronically (e.g. mail attachment, digital drop box) ($z = -3.022$; $p = 0.003$); use a variety of instructional formats in addition to lecture, such as small groups, peer assisted learning, and hands-on activities ($z = -2.526$; $p = 0.012$); and Use technology so that my course material can be available in a variety of formats (e.g. podcast of lecture available for download, course readings available as mp3 files) ($z = -2.863$; $p = 0.004$).

Table 3: Difference between Faculty & Students (Attitudes & Actions)

Item	Z score (Faculty: Student Attitudes)	P value (Faculty: Student Attitudes)	Z score (Faculty: Student Action)	P value (Faculty: Student Action)
Allow students to express comprehension in multiple ways.	-0.426	0.670	-3.463	0.000*
Allow students to demonstrate their knowledge and skills in ways other than traditional tests and exams (e.g. written essays, portfolios, journals).	-0.377	0.707	-3.558	0.000*
Allow flexibility with assignment deadlines in my course(s) for ANY student who expresses a need.	-2.163	0.031*	-1.659	0.097
Allow flexible response options on exams (e.g., change from written to oral) for ANY student who expresses a need.	-1.734	0.083	-1.547	0.122
Post electronic versions of course handouts.	-1.602	0.109	-4.287	0.000*
Use a course website (e.g. Blackboard or faculty web page).	-1.493	0.135	-2.839	0.005*
Post lecture notes online (on Blackboard or another website) for ALL students.	-2.397	0.017*	-0.613	0.540
Allow students flexibility in how they submit assignments electronically (e.g. mail attachment, digital drop box).	-3.022	0.003*	-1.211	0.226
Connect key points with larger course objectives during class sessions.	-1.709	0.087	-1.927	0.054
Summarize key points throughout each class session.	-0.094	0.925	-2.462	0.014*
Begin each class session with an outline/agenda of the topics that will be covered.	-1.518	0.129	-2.864	0.004*

Repeat the question back to the class before answering when a question is asked during a class session.	-0.472	0.637	-0.662	0.508
Create multiple opportunities for engagement.	-1.082	0.279	-2.316	0.021*
Use a variety of instructional formats in addition to lecture, such as small groups, peer assisted learning, and hands-on activities.	-2.526	0.012*	-4.541	0.000*
Use technology so that my course material can be available in a variety of formats (e.g. podcast of lecture available for download, course readings available as mp3 files).	-2.863	0.004*	-1.782	0.075
Survey my classroom in advance to anticipate any physical barriers.	-0.005	0.996	-0.629	0.529
Supplement class sessions and reading assignments with visual aids (e.g. photographs, videos, diagrams, interactive simulations).	-0.343	0.732	-1.936	0.053
Use interactive technology to facilitate class communication and participation (e.g. Discussion Board).	-0.756	0.450	-0.594	0.552

* Significance P>=0.05

(b) Is there a statistically significant difference between faculty and students' attitudes toward the _implementation_ of principles and practices in their classrooms?

Using a non-parametric statistical measure – the Mann-Whitney U test – there was a statistically different response between the two respondent groups in relation to the implementation of strategies for eight inventory items (44 per cent) (see Table 3). The nine items that were statistically different were: allow students to express comprehension in multiple ways ($z = -3.483$; $p = 0.000$); allow students to demonstrate their knowledge and skills in ways other than traditional tests and exams (e.g. written essays, portfolios, journals)($z = -3.558$; $p = 0.000$); post electronic versions of course handouts ($z = -4.287$; $p = 0.000$); use a course website (e.g. Blackboard or faculty web page) ($z = -2.839$; $p = 0.005$); summarize key points throughout each class session ($z = -2.462$; $p = 0.014$); begin each class session with an outline/agenda of the topics that will be covered ($z = -2.864$; $p = 0.004$); create multiple opportunities for engagement ($z = -2.316$; $p = 0.021$); and use a variety of instructional formats in addition to lecture, such as small groups, peer assisted learning, and hands-on activities ($z = -4.541$; $p = 0.000$).

Only three faculty respondents added to the open-ended section of the survey that encouraged participants to add thoughts not covered in the survey. Their responses were as follows:
- "[Often] good intentions / personal expectations prove to be more difficult to follow through with... [there are] only so many hours in the day, only so much energy to expend."
- "More resources need to be put into UDL awareness and training; classroom and online training for teaching students with disabilities should be available and required. I have a blind student in one class and a student in a wheelchair in another class and both required accommodations that I wasn't trained to provide, so I had to learn on the fly."
- "I found that group work and one-to-one advising helps students with disabilities a lot."

Two students added to the open-ended section of the survey, as follows:
- "Perhaps allowing extra time outside of class for students to make appointments with COMM instructors would help a lot."
- "It is important for professors to BELIEVE students when they say they need help with something, or when they struggle."

DISCUSSION

Students with disabilities are a growing higher education sub-group in both the United States of America and abroad (A. Lombardi, et al., 2015); they are protected by state, federal, and local laws that prohibit discrimination and require equal levels of access to academic services, environments, and resources. Universal Design (UD) is a framework intended to provide flexibility and support to the greatest number of learners via a proactive approach to instruction design (P. King-Sears, 2014). Extant research has largely explored attitudes related to UD in the college classroom from a faculty or student perspective, this study explores perceptions of

UD among faculty and the students they teach (and student perceptions of the same faculty) using an adapted version of a self-report survey (ITSI and ITSI/S; (Gawronski, et al., 2016; A. R. Lombardi, et al., 2011).

The results of this study indicate that both faculty and student respondents strongly agree with the importance of each of the UD strategies/tactics presented in this study (across all six UD subsets: *Multiple Means of Presentation* (8 items), *Inclusive Lecture Strategies* (4 items), *Accommodations* (7 items), *Campus Resources* (3 items), *Inclusive Assessment* (4 items), and *Accessible Course Materials* (3 items). However, despite agreement from the two respondent groups about the importance of UD, the study found that for students, the valence of agreement with statements about the importance of UD was higher than their agreement with statements about the actual implementation of the strategies/practices by their instructors in their classrooms for <u>all</u> of the subset items (a statistically significant difference in agreement for all 18 items).

For faculty, the valence of agreement with statements about the importance of UD was also higher than their agreement with statements about the implementation of the strategies/practices in their classrooms for all but one of the items (faculty agreed more strongly in the 'action' portion of the survey vs. the 'attitude' portion to the item - 'allow flexibility with assignment deadlines in my course(s) for ANY student who expresses a need'). There was a statistically significant difference in agreement for only four items when faculty responses to the importance of UD was compared with their implementation of the strategies/practices in their classrooms for the following items: 'connect key points with larger course objectives during class sessions'; 'repeat the question back to the class before answering when a question is asked during a class session'; 'use technology so that my course material can be available in a variety of formats (e.g. podcast of lecture available for download, course readings available as mp3 files)'; and 'survey my classroom in advance to anticipate any physical barriers.'

When faculty attitudes were compared with student attitudes to UDL there was a statistically significant difference in agreement for 5 of the 18 items - 'allow flexibility with assignment deadlines in my course(s) for ANY student who expresses a need'; 'post lecture notes online (on Blackboard or another website) for ALL students'; 'allow students flexibility in how they submit assignments electronically (e.g. mail attachment, digital drop box)'; 'use a variety of instructional formats in addition to lecture, such as small groups, peer assisted learning, and hands-on activities'; and 'use technology so that my course material can be available in a variety of formats (e.g. podcast of lecture available for download, course readings available as mp3 files)'). For the most part, the valence of faculty and student agreement to statements about the importance of UD was similar.

With regard to faculty and students attitude toward the implementation of UDL in their classrooms, there was a statistically significant difference in agreement for eight of the 18 items, including: 'allow students to express comprehension in multiple ways'; 'allow students to demonstrate their knowledge and skills in ways other than traditional tests and exams (e.g. written essays, portfolios, journals; post electronic versions of course; use a course website (e.g. Blackboard or faculty web page); summarize key points throughout each class session; begin each class session with an outline/agenda of the topics that will be covered; create multiple opportunities for engagement; and use a variety of instructional formats in addition to lecture, such as small groups, peer assisted learning, and hands-on activities. Faculty and students mostly agreed with one another when responding to statements about implementation of strategies/practices in their classrooms.

In the open-ended portion of the survey, faculty indicated that "[Often] good intentions / personal expectations prove to be more difficult to follow through with... [there are] only so many hours in the day, only so much energy to expend" and that "[m]ore resources need to be put into UDL awareness and training; classroom and online training for teaching students with disabilities should be available and required." These findings align with research that indicates that faculty lack experience teaching students with disabilities, and how to properly implement accommodations (Baggett, 1994; Cawthon & Cole, 2010; Thompson, et al., 1997). It also aligns with research found that faculty overwhelmingly reported that they did not implement inclusive instruction in their classes, most likely due to a lack of relevant campus-wide professional development initiatives to provide faculty with training or information about UD (LaRocco & Wilken, 2013).

A student who participated in the study indicated that "[i]t is important for professors to BELIEVE students when they say they need help with something, or when they struggle." This supports previous research that found students decide for varying reasons not to self-disclose (Getzel & Thoma, 2008), including a fear that they will not be believed because of poor societal perceptions of people with disabilities (May & Stone, 2010), or if the disability is of a psychological or psychiatric nature, such as anxiety or depression.

While A. R. Lombardi, et al. (2011) found that female faculty were more likely than their male counterparts to accommodate students with disabilities, and tenure-track faculty appeared to be less accommodating and less

willing than non-tenure-track faculty, this finding was not borne out in the current study; in addition, age and ethnicity did not appear to impact faculty or student attitudes.

The findings outlined in the paper are potentially problematic in the context of research that indicates that inclusive instruction provides a more holistic approach to the design of materials and instructional methods, and has the potential to, among other things, reduce barriers, and increase student participation and success without extensive accommodations (Gawronski, et al., 2016) (Rose, et al., 2005) (CAST, 2018). Factors students have identified as having a positive impact on outcomes are access to disability support services and forming relationships with faculty (Getzel & Thoma, 2008), outlines of notes, pause and question procedures during lectures, reading guides, and study guides (Madaus, et al., 2003), and the use of digital materials, which are inherently flexible and customizable to individual student needs (Hall, et al., 2003).

Additional Recommendations for Implementation of UD in the College Classroom (adapted from A. R. Lombardi, et al. (2011):
- Provide instruction/information sessions with examples and resources
- Provide workshops to understand WHY and HOW of UD for the teacher and more rewarding for the student
- Consider developing a team approach with mentors and coaches
- Provide planning/meeting time
- Start small, one lesson or unit at a time, not abrupt change.
- Allow students to express comprehension in multiple ways.
- Allow students to demonstrate their knowledge and skills in ways other than traditional tests and exams (e.g. written essays, portfolios, journals).
- Allow flexibility with assignment deadlines in my course(s) for ANY student who expresses a need.
- Allow flexible response options on exams (e.g., change from written to oral) for ANY student who expresses a need.
- Post electronic versions of course handouts.
- Use a course website (e.g. Blackboard or faculty web page).
- Post lecture notes online (on LMS, Etc.) for ALL students.
- Allow students flexibility in how they submit assignments electronically (e.g. mail attachment, digital drop box).
- Connect key points with larger course objectives during class sessions.
- Summarize key points throughout each class session.
- Begin each class session with an outline/agenda of the topics that will be covered.
- Repeat the question back to the class before answering when a question is asked during a class session.
- Create multiple opportunities for engagement.
- Use a variety of instructional formats in addition to lecture, such as small groups, peer assisted learning, and hands-on activities.
- Use technology so that my course material can be available in a variety of formats (e.g. podcast of lecture available for download, course readings available as mp3 files).
- Survey classrooms in advance to anticipate any physical barriers.
- Supplement class sessions and reading assignments with visual aids (e.g. photographs, videos, diagrams, interactive simulations).
- Use interactive technology to facilitate class communication and participation (e.g. Discussion Board).

CONCLUSION/LIMITATIONS

Without doubt, the growing population of students requesting accommodations creates challenges for college faculty and their students (Jensen, et al., 2004). An essential element of student persistence in college is the ability to develop meaningful student-faculty relationships (Astin, 1993; Tinto, 1993). Research indicates that, for the most part, faculty members are willing to provide accommodations for students with learning disabilities (Leyser, et al., 1998), but are challenged by perceptions that accommodations impact the academic integrity of courses, programs, and the institution (Bourke, et al., 2000). Vega and Tayler (2005) ague that the role of faculty has shifted, they are no longer merely responsible for ensuring a student learns the material, rather, their role is to facilitate students' interpretation of the information.

College faculty and students are undoubtedly operating in more competitive and dynamic environments than ever. It is therefore important to identify and eliminate potential barriers to learning and student success, particularly those with disabilities. Expanding knowledge of both groups' perceptions of UD strategies in the classroom will potentially benefit all parties. Extant research has largely explored attitudes toward UD from a

faculty or student perspective, this exploratory case study employed quantitative research methods to explore perceptions of UD among faculty and students they are currently teaching.

Although the survey response rate was relatively high (60 per cent for faculty and 16 per cent for students), the convenience nature of the study and small sample represents a limitation; subsequently, external validity is low. In addition, differences in perceptions may be due to differences in course management and instructor variables. Another limitation of the study relates to causal inference - selection bias in particular as students who participated in the study were not randomly assigned to classes. In addition, while each student was in a communication studies class, the course descriptions, learning goals and outcomes inevitably varied.

Future research will expand the study by incorporating qualitative elements, and increasing the representativeness and generalizability of the study by increasing sample size (including other universities).

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