Message from the Editor-in-Chief

Hello from TOJDEL

TOJDEL welcomes you. TOJDEL looks for academic articles on the issues of distance education and e-learning and may address assessment, attitudes, beliefs, curriculum, equity, research, translating research into practice, learning theory, alternative conceptions, socio-cultural issues, special populations, and integration of subjects. The articles should discuss the perspectives of students, teachers, school administrators and communities. TOJDEL contributes to the development of both theory and practice in the field of distance education and e-learning. TOJDEL accepts academically robust papers, topical articles and case studies that contribute to the area of research in distance education and e-learning.

The aim of TOJDEL is to help students, teachers, school administrators and communities better understand how to organize distance education for learning and teaching activities. The submitted articles should be original, unpublished, and not in consideration for publication elsewhere at the time of submission to TOJDEL. TOJDEL provides perspectives on topics relevant to the study, implementation and management of learning with technology.

I am always honored to be the editor in chief of TOJDEL. Many persons gave their valuable contributions for this issue.

TOJDEL, Governor State University and Sakarya University will organize the IDEC-2018 International Distance Education Conference (IDEC 2018) (www.id-ec.net) in July, 2018 in Paris, France.

Call for Papers

TOJDEL invites article contributions. Submitted articles should be about all aspects of distance education and e-learning. These papers may address assessment, attitudes, beliefs, curriculum, equity, research, translating research into practice, learning theory, alternative conceptions, socio-cultural issues, special populations, and integration of subjects. The articles should also discuss the perspectives of students, teachers, school administrators and communities.

The articles should be original, unpublished, and not in consideration for publication elsewhere at the time of submission to TOJDEL.

For any suggestions and comments on the international online journal TOJET, please do not hesitate to fill out the comments & suggestion form.

January 01, 2018

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Sakarya University

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AN EMPIRICAL INVESTIGATION INTO THE FACTORS DISTORTING THE RHETORIC OF HUMAN CAPITAL DEVELOPMENT WITH SPECIFIC REFERENCE TO DISTANCE EDUCATION INSTITUTIONS IN TAMILNADU, INDIA

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ABSTRACT
Human Capital Development in any organization is an important task of the human resource department. In distance education institutions in Tamil nadu, especially when the head count working for an enterprise is very low, human capital management becomes a challenge for the organization. This research is an attempt to empirically identify the factors that distort the rhetoric of human capital development especially with specific reference to the distance education institutions in Tamil nadu, India. Primary data in quantitative form has been collected from 387 distance education co-ordinators distributed across numerous distance education institutions distributed across Tamilnadu, India. Data collected from survey has been analysed using Principal Component Analysis Technique with SPSS. The research findings reveal that leadership skills, organizational culture and training and development practices adapted by the organization stand as major factors in creating an impact on the rhetoric of Human capital development. The research in addition to that recommends strategies to the distance education institutions of Tamilnadu in enhancing their human capital development practices.
Keywords: Distance Education Institutions in Tamilnadu, Rhetoric of Human Capital Development, Factors of Human Capital Development, Human Capital Development in Educational Institutions.

1.   **Introduction**

Human capital is stated as a key factor in increasing a firm resources and workforces so as to enhance productive in addition to maintain competitive edge (Marimuthu, Arokiasamy and Ismail, 2009). In current global and competitive market, human capital is receiving more attention with rising globalization and as well the capacity of the employment market because of the current recession in the diverse economies of the globe. Both developed and developing nations put stresses on a human capital towards fostering the financial development by dedicating essential time and determinations. As a consequence human capital is one of the essential keys to take part in the international market. These days, firms are combined by rivals, irrespective of industry. Firms aspire to enhance their labour force by means of inclusive human capital development systems not merely to accomplish industry objectives but essential point is for a long lasting endurance and sustainability. In general, human capital implies a collection of knowledge, proficiency, approach and behaviour that entrenched in an individual. In addition, it has received enough appreciation amongst establishment due to its potential to provide competitive edge and assure long-standing financial development. Individuals and individuals' progressions, it is being sued, generate competitive edge essentially by means of the features of being constructive, intermittent and non-compatible which signifies that a link among Human resource practices and the organization-specific nature of precise businesses could promote distinctiveness and generate high obstacles to simulation (Kulvisaechana, 2006). To construct a competitive edge, it is essential for firms to describe what actually human capital is and how to provide efficient human capital development. Current challenges like globalization and technological development, have endorsed several nations and firms to search for new and innovative methods to sustain competitive edge. In response, the usual point is that the triumph relies in considerable part on the people by means of greater levels of individual competency. Ultimately, the individuals are important resources and could be acknowledged within a structure of human capital. The process to build the human capital could be classified into two different types. The primary thing is to use 'human as manual labour force' in the standard financial viewpoint. The second is depending on the idea that the asset of physical capital might expose the similar efficiency with that of human capital on training and development (Dae-Borg, 2009). India has progressively developed as a knowledge-based market because of the large quantity

of talented, proficient, adaptable and competent human capital. By means of the continually rising impact of liberalization and globalization, the country has huge prospects to institute its individual place in the globe. Education industry in India is measured to be a developing industry around the world, due to its human capital development, huge possibility for development and socio-economic influence (Durga and Tribhuvan 2015). One of the most significant elements which influence workforce productivity is certainly human capital. Regardless of the significance of this particular sector, there are numerous difficulties with the education sector especially when offered through a distance mode and human capital is one of the major problems among others. According to Afrooz et al (2010), human capital turns out to be an element detachable from and to such extent interchangeable for the further factors in the manufacturing explicitly undistinguishable workforce and physical capital. In addition, human capital concept recommends that training increases the output and efficiency of labours by instructing beneficial knowledge and proficiencies, henceforth nurturing employees' future revenue by raising their lifespan incomes. Human capital has an important role in financial development as human beings take up the hotbed of manufacturing process, supply and delivery. From a viewpoint of macroeconomic, the accretion of human capital efficiency, enables technological inventions and revolutions, raises profits to capital and generates evolution in the education industry. Strategies and programs to improve human capital in education industry must aspire to secure the educational requirements of the country; construct the capability for value creation; use accessible assets and current technologies that speed up development in the industry. The cluster approach is one of the methods that would assist in dealing with essential problems for example human capital, labour force development, infrastructure design, capability building and enlistment (Penda, 2012).

These days, firms are in search of a new type of capital called as human capital and eventually it is accepted that human capital is an important element that influences the development and existence of the businesses than any other element. Human capital in education industry is an essential input in order to work toward higher competitive edges (Mohamedi & Ghorbanhosseini, 2015). There are certain number of key extents that could deform the rhetoric of human capital, comprising corporate policy, managerial structure and HRM practices, by means of the intellectual forms of individuals. Each element holds certain crucial problems capable of defining the attainment and non-fulfilment of human capital development. Like any other industry, in distance education institutions human capital counts labour as a product which could be operated with regard to buying and sale. This research intends to investigate in detail the factors that distort the rhetoric of Human Capital development with specific reference to distance education institutions in TamilNadu, India.

2. Literature Review:

2.1 Meaning and Definition Human Capital:

Human capital as defined by (Kulvisaechana, 2005) is "the stock of skills, abilities, knowledge that is embedded in an individual employee that results from the endowment of nature and subsequent investment in the system of training, experience and education. Human capital is also called as the ability of men and women to have gained at some point and cost that commands the price of the labour market due to their usefulness in the process of production in the organisation. According to Barro and Lee, (2010) Human capital is considered as the educational component that contributes towheads the labour productivity of an individual and his own earnings which is important for the production process of the firm. The human capital is referred as "the ability, capacity and efficiency of the people to transform the capital and raw materials into services or goods and also the consensus of the skills learned through the education system".

2.2 Factors distorting the rhetoric of human capital development:

Recently, academicians and also policy makers are emphasizing on the role of forming the human capital as it induces the economic development (Kapstein, 2002). By creation of human capital the countries will be more attractive in its private investment both in domestic as well as foreign popularity. Through the investment via human capital development the countries can grow in prosperity. But if the country lacks the human capital and educational market, the more qualified citizens get denied for their basic skills as they need to contribute for the economic growth of their nation. Transferring the human capital with skills and technology can potentially contribute towards growth. Political economic channels can act as a burden for the human capital development as they get attracted towards the training system and domestic education associated with remarks.The factors affecting the human resource development in universities was clearly investigated by Atthakorn, (2013). The main factors that affect the development of human capital were as follows; policy support from the external organisation, positive incentives, support from the executives, communication within the organisation and cooperation with external agencies. The main fact acquire about the human capital is that human resource aids the organisational ability for competing which is stimulated by the learning process, health care and training.

Thus the human capital helps the improvisation of values as well as capacity in the organisational competency. The internal organisational factors that affects the human capital development in the educational university includes support of administrator, negative incentives, positive incentives, objectives and goal settings, ideological incentives and other personnel development policies.

Critical factors that affects the human resource development in the Arab world has been explored by AlSayyed, (2014). Human resource/capital development is the long been subject of interest for many management scholars and is prioritized in academic discourse in domain of management. But in the past decade, human capital development in the globe is quite intensive due to its critical factors that change the motivation of the human resource development in the organisation. Human capital must have the qualities like valuable, rare, cannot be imitated and no good substitutes. The main factors that affect the human capital development are distinguished as external and internal factors; they are motivation, leadership style, transformational leaders, organisational commitment, health and safety measures, creativity and also innovation, education, competitiveness demographic trends and government rules and regulations and labour unions.

Son, (2010) presented a paper about human capital development with two main objectives they are assessing and, measuring the gaps of human capital stocks globally and the human capital contribution in the industrialized countries. Thus the study presents how effectively each regions of the world improvises the human capital and the time taken for the capital to catch up with growth. Thus the human capital growth gets affected by factors like employment growth in decomposition growth through elasticity in the employment growth. Then it is conjectured that the increase in the human capital make the decrease in the elasticity of employees growth which results in less labour intensive in the economy and higher growth in economy. Hence the point of this proposed method is to understand the importance of the micro-links between the human capital and labour market which are both directly and indirectly related.

The modern economy transition based on the knowledge and information can only make the human capital the most important component of welfare of the economy stated by Didenko, (2007). So the problem in the human capital growth and development is very interesting research objective. But sometimes the concept of the human capital is restricted to the productive capabilities and skills of the people that acquire the cost taken as investment. Globalization is the higher speed connection that transforms the technological development, population migration, economical development and commercial intercourse as the influencing factors of human capital development. But the education plays the last but not least part in globalization in the growth and development of human capital. Moreover, to maintain the competitive position in any industries the right level as well as right type of human capital investment is necessary to make the economy prosper without any hurdles.

2.2.1 Training and development

A study by Gamage and Imbulana (2013) suggested that training and development play an important role in human capital development. Top management should understand the importance of the training & development and its benefits, how it contributes to uplift organizational personality and, mental conditions of employees (Pilar, 2010). They should actively participate in training & implementing process, and pay adequate attention for implementing problems and difficulties and respond them in an immediate manner. According to Muhammad et al (2011) top management should motivate employees to carry out these activities with enthusiasm. Employees who are engaging different kind of duties does not have proper knowledge how training and development could be utilize for their activities. Especially for technical staff, such setbacks should be overcome by conducting special education programs particularly designed for them. studies says that the most manipulating training properties was training method followed by training objectives, training management, training environment, and trainer while for learning, the greatest variation was also given by training methods but followed by trainer, training environment, training management and training material. Bagher and David (2010) explain that diversity training has a vital role to play in fostering better equality, inclusion and fairness in the place of work. Tiwari (2014) adds that as globalization impacts increase the need for training and development in all sectors, including the education sector plays an important role in human resource development.

2.2.2 Organization culture

Koycheva (2015) led an investigation of the organizational culture in a teacher's university, expecting to discover a method for enhancing the university's effectiveness in a focused situation and recognizing the part organizational culture played in the university's human resource development. The study revealed that organizational culture does have an impact on the human resource development. The studies conducted by Gnezdilova (2014), Jamanbalayeva et al., (2013), Karelskaya, 2013, Shcherbakova and Potravnaya, 2014,

Gnedova et al., (2015) have also emphasized the importance of organizational culture with respect to human resource development especially at educational institutions.

2.2.3 Leadership skills
The impact of leadership skills in human capital development has been studied by numerous researchers in the last two decades (Fullan, Hill, and Crevola, 2006; Berry, Johnson, and Montgomery, 2005; Starratt 1995; Barth 2001; Andrews & Crowther, 2002; Birky, Shelton, & Headley, 2006; Danielson, 2006). Their studies revealed that leadership at educational institutions progressively concentrate towards the value that leaders have for students, fellow staff members and administrators and it covers the development of all forms of human resources associated with the educational institution and focuses towards their effective management for rendering better outcomes.

2.4 Conceptual Framework:

The following figure (Figure 1) illustrates the conceptual framework for the factors distorting the rhetoric of human capital development with specific reference to Distance Education Institutions in TamilNadu, India

Figure 1: Conceptual framework for the factors distorting the rhetoric of human capital development with specific reference to Distance Education Institutions in TamilNadu, India

Source: Author

2.4.1 Hypothesis:

The following are the research hypotheses for the factors distorting the rhetoric of human capital development with specific reference to Distance Education Institutions in TamilNadu, India.

- Null Hypothesis: Leadership skills does not distort the rhetoric of human capital development with specific reference to Distance Education Institutions
  Alternative Hypothesis: Leadership skills distort the rhetoric of human capital development with specific reference to Distance Education Institutions
- Null Hypothesis: Organization culture does not distort the rhetoric of human capital development with specific reference to Distance Education Institutions
  Alternative Hypothesis: Organization culture distort the rhetoric of human capital development with specific reference to Distance Education Institutions
- Null Hypothesis: Training and development does not distort the rhetoric of human capital development with specific reference to Distance Education Institutions
  Alternative Hypothesis: Training and development distort the rhetoric of human capital development with specific reference to Distance Education Institutions

3. Research methodology

This section includes about the examination design and the research strategies chosen for the further procedures of the investigation. This segment will depict the sampling procedures, proposed theory utilized for the examination and the objective respondents and the objective sampling unit for the research. Furthermore, the approval strategies and the moral thought will be considered by the examiner.

As indicated by the author Kumar (2002), an examination paradigm is a blue print of the examination. It is the primary procedure in the examination systems definition. Research model is broadly sectioned into positivism and Interpretivism. Positivism is said to be the assessment survey based system and it is broadly utilized. Then again, Interpretivism is the meeting technique that goes under the subjective examination.

This research makes utilization of the positivism technique strategy since it takes any interviews, nor utilizing the subjective investigation.

3.1 Research approach

The research approach is the orderly perspective of the system of the investigation subsequent to choosing the model. This is arranged into quantitative too subjective approaches. Quantitative approach depends on the numbers and certainties while subjective approach depends on the correspondence and relations between the researcher and the responder (Carter 1997).

This examination makes utilization of the numerical approach. This will utilize the information of the factors distorting the rhetoric of human capital development with specific reference to Distance Education Institutions in Chennai. The numerical examination makes the design of the research in an organized way and since it will give a descriptive view about the examination without deviation.

3.2 Design

Research design is the theoretical comprehension of the examination procedure. It is the base for the gathering of tests. It is divided into exploratory research arrange and conclusive research arrange. Conclusive research design is again characterized into descriptive and causal research designs (Weiten 2010).

The researcher tries to utilize the descriptive examination strategy to make the investigation in a depicted way. The issue is confined as of now and henceforth descriptive research design is appropriate for this examination.

3.3 Sampling techniques

From the authors, Crowther and Lancaster (2008) the sampling is the arrangement of the members from a mass number of populaces. Sampling techniques are isolated into probability sampling and non-probability sampling.

The present study adapts *cluster sampling*. The researcher has divided the SMEs in TamilNadu based on their geographic locations and chosen Chennai as the target location for data collection. Taking into consideration 8 Tier 1 cities in India, that are pioneers in Distance education Industry, Chennai is the one and only Tier 1 city belonging to Tamilnadu. The researcher therefore has chosen Chennai as the sample since it would represent entire Tamilnadu. The sample size of the study would be 387 proprietors or owners of Distance Education Institutions in Chennai, Tamilnadu.

3.4 Data collection methods

Primary data accumulation is the one time data gathered and utilized, which is exclusively designed and shaped by the researcher and the secondary one is the assets gathered from alternate sources like web, company's site, diaries, magazines and so on (Gupta and Gupta 2011). This research makes use of primary data collected from 387 respondents who are either the teaching and non-teaching staff of distance education universities of Tamilnadu

3.5 Research Instrument

The instrument adapted in this research is comprised of two sections, the first one being the section with items used to identify the demographic profile of the respondents namely gender, age, educational qualification, year of experience in the distance education industry, etc. The second one is the major part of the instrument used to measure the factors that distort the rhetoric of human capital management namely leadership skills, training and development and organizational culture. For measuring the organizational culture, a 15 item scale measuring four subscales namely family orientation, open communication, managerial knowledge and approach of the team proposed by Tang et al (2000) has been employed by the researcher as it is. The researcher has made use of the six dimension based instrument proposed by Podsakoff et al (1990), in measuring the leadership skills prevalent at the target organizations. Setting expectations of high performance, promoting intellectual stimulation, identification and articulation of a vision, fostering group goal acceptance, provision of an appropriate model and finally offering support to each and every individual are the six dimensions that have been applied in this research in measuring leadership skills. Likewise, training and development has been measured with the help of the instrument namely General Training Effectiveness Scale proposed by Aziz (2015). It is a 10-item scale and measures the effectiveness of training and development using 3 dimensions namely learning performance, organizational performance and individual performance and the researcher has employed the same in this.

3.5 Analysis and interpretation of data

Examination and clarification may take from a few days to numerous months. In numerous private investigations of research, that incorporates just an element of data assessment and comprehension may take huge amount of time (Salmon and Nichols, 1983). The research makes use of simple percentage method, graphical methods and mainly the multivariate statistic principal component analysis for the analysis of the collected primary data. PCA according to Hair et al (2010), is applied when the same size is too large and the variables can be reduced into sub factors based on certain common characteristics. The software employed for conducting the data analysis is SPSS version 17.0

3.6 Validation techniques and ethics

The research makes utilization of validity and reliability. Valid data accumulation is the fundamental success of the examination and the primary data sources are steady. Researcher has ensured to create a valid questionnaire by referring previous literature and getting an expert opinion from field experts on the questionnaire. Reliability has been ensured by calculation of Cronbach's alpha (α) and identifying that the value is greater than 0.7 (Table 1) as advised by George and Mallery (2003). Ethics has been ensured in this research by the researcher by seeking prior approval of permission from respondents before collecting primary data from them and keeping their data confidential and exclusively employing them for academic purpose.

4. Analysis of Factors Distorting the Rhetoric of Human Capital Development with Specific Reference to Distance Education Institutions in TamilNadu, India

This section involves analysis of factors distorting the rhetoric of human capital development in Distance Education Institutions in TamilNadu, India. The analysis includes; testing reliability and validity of the data, analysis of socio-demographic factors of the respondents and analysis of data concerning the research objectives. The research objectives are stated here below in terms of research hypotheses.

4.1 Reliability Tests

Variable type	Cronbach's Alpha	N of Variables	N of Items
Independent	.751	47	387
Socio-demographic	.716	7	387
Dependent	.874	6	387

Table 1: Cronbach's test for reliability

According to Cronbach's reliability tests, the data from 47 independent variables from a sample size of 387 respondents on analysis of factors distorting the rhetoric of human capital development in Distance Education Institutions in TamilNadu, India has an alpha value of 0.751. This alpha statistic shows that the data from independent variables is almost 75.1% reliable for the data analysis. Similarly, the Cronbach's alpha for 7 socio-demographic factors is 0.716. This statistic shows that the data from socio-demographic factors is almost 71.6% reliable. Lastly the dependent variable in six attributes of the study shows a Cronbach's alpha of 0.874 indicating that the dependent variable is 87.4% reliable and valid. In conclusion, reliability tests show that most of the independent variables, socio-demographic factors and dependent variable possess more than 70% reliability. Therefore, these data has reliability, validity and feasibility attributes necessary for analysis and generation of information that can be used to answer the research questions.

4.2 Analysis of socio-demographic data of Respondents

Gender	Frequency	Percent	Cumulative Percent
Male	185	47.8	47.8
Female	202	52.2	100.0
Total	387	100.0	

Table 2: Distribution of Gender

Table 2 shows that the female gender has a relative percentage of 52.2% in this study as compared to the males at 47.8%. These results show that the females are more than the males as shown using the pie chart below.
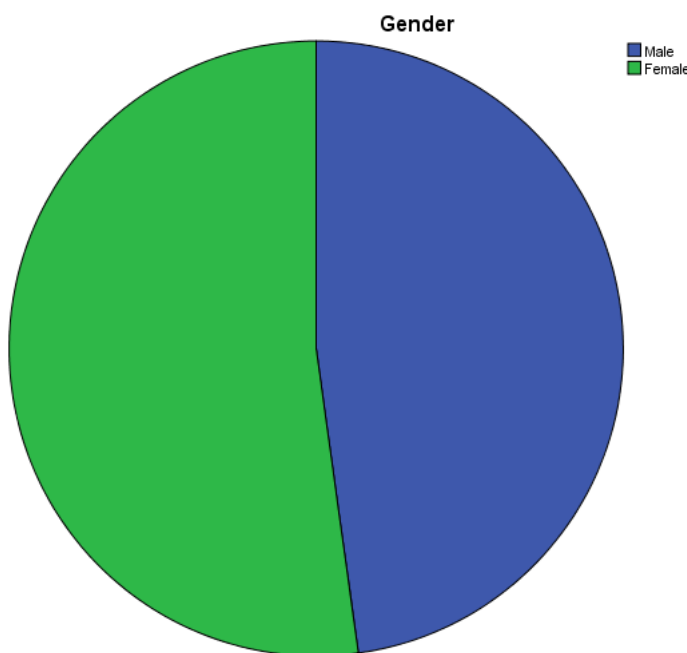
Figure 2: Pie Chart of Gender Distribution

Age	Frequency	Percent	Cumulative Percent
25-30	60	15.5	15.5
30-40	133	34.4	49.9
40-50	97	25.1	74.9
50+	97	25.1	100.0
Total	387	100.0	

Table 3: Distribution of Age

According to Table 3, results show that, 30-40 years age group is the modal age with a relative frequency of 34.4%. The other age groups are: 40-50 years with frequency of 25.1% tallying with the 50+ years age group with relative frequency of 25.1% and finally 25-30 years at 15.5%. The age distribution is not normally distributed as shown in the histogram below.
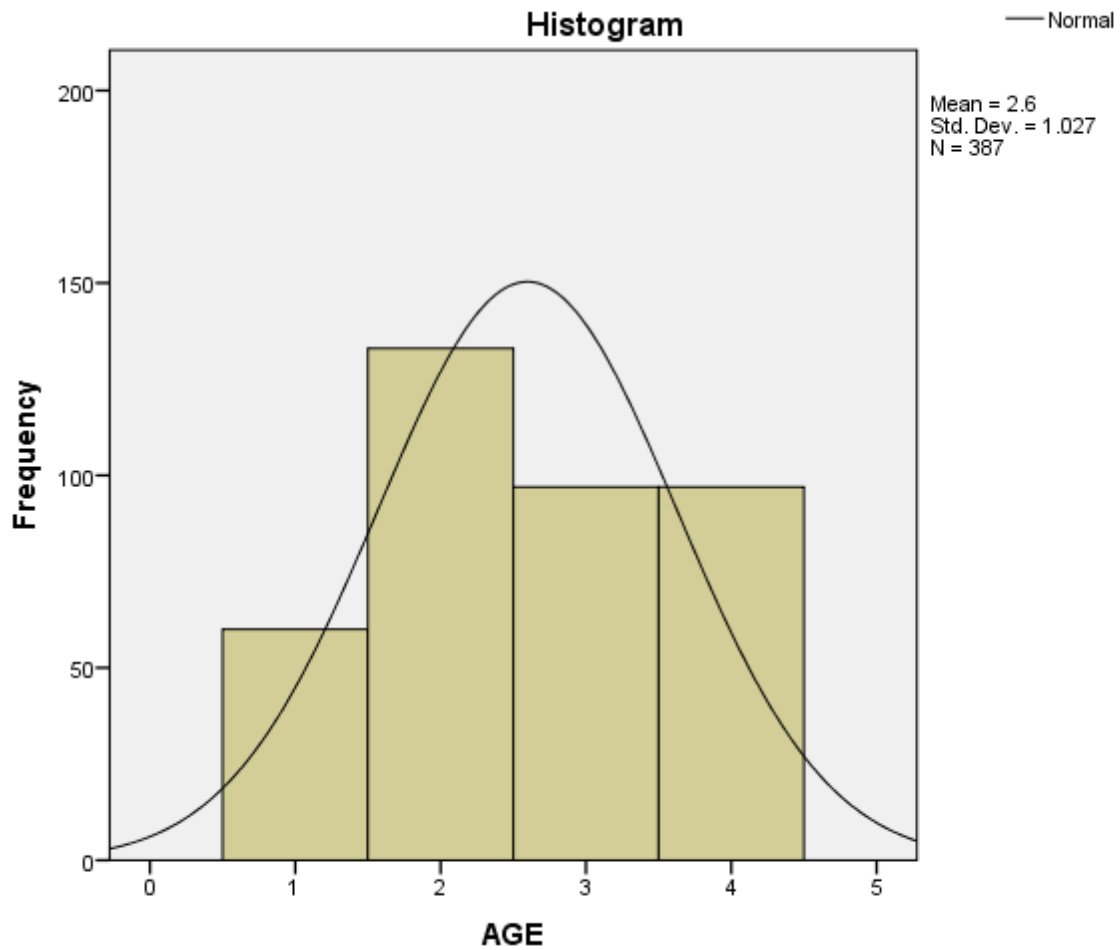
Figure 3: Histogram of age distribution

Table 4: Distribution of Level of Education

Education	Frequency	Percent	Cumulative Percent
Undergraduate	107	27.6	27.6
Masters	146	37.7	65.4
Doctorate	134	34.6	100.0
Total	387	100.0	

On the formal educational attainment, results showed that majority of the respondents have postgraduate (Masters) degree level with a frequency of 37.7% followed by the Doctorate degree with a frequency of 34.6% and finally the Undergraduate degree was the minority with 27.6%. The bar graph below shows the education level distribution of respondents.
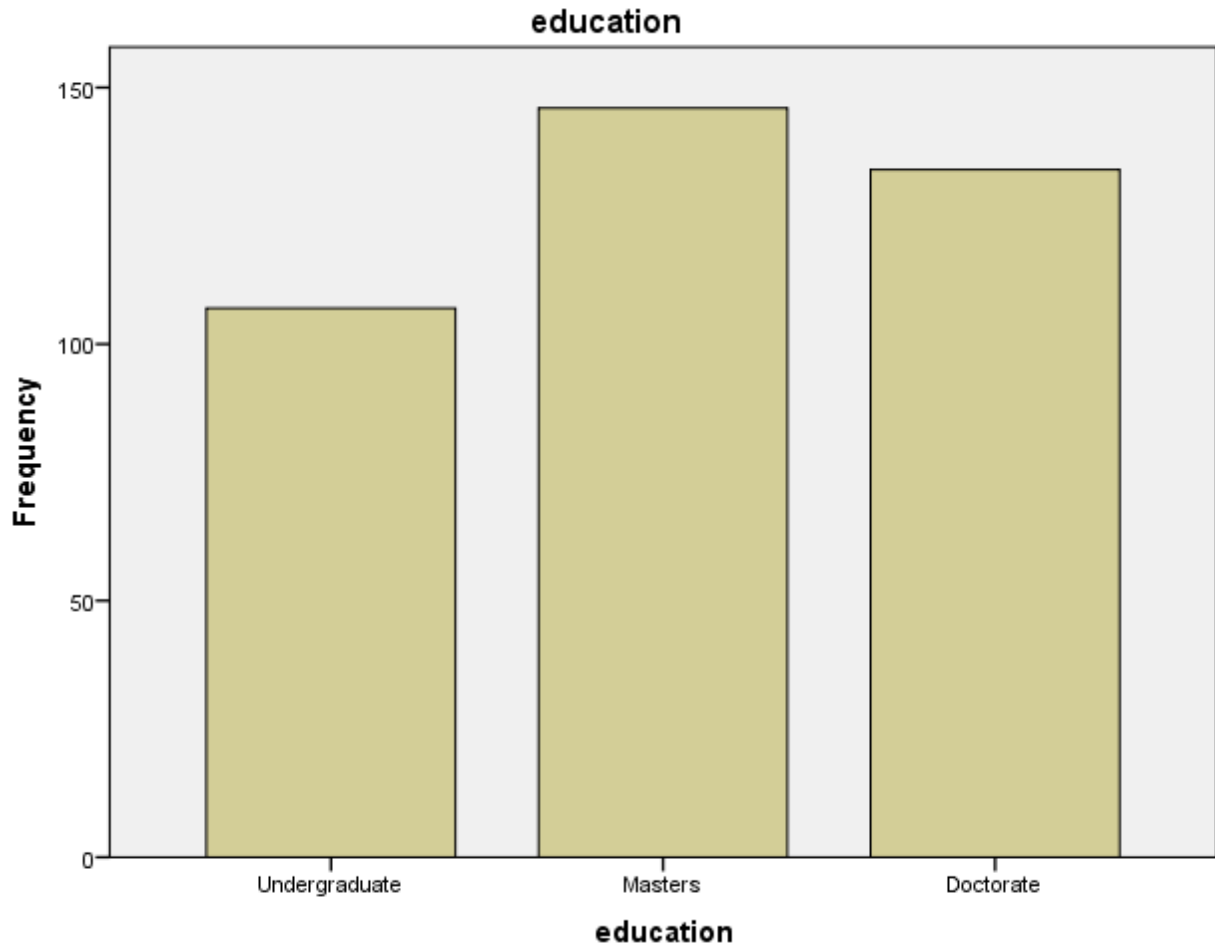
Figure 4: Bar Chart of Education Distribution

Experience	Frequency	Percent	Cumulative Percent
0-5	102	26.4	26.4
5-10	93	24.0	50.4
10-15	88	22.7	73.1
15+	104	26.9	100.0
Total	387	100.0	

Table 5: Distribution of Total Working Experience

The total working experience in years, the analysis realized that those who have worked for more than 15 years (15+) were majority with relative frequency of 26.9% followed by 0-5 years with 26.4%. The other working experiences were: those with 5-10 years of experience were 24.0% and finally those with 10-15 years of experience at 22.7%. The histogram display below shows the distribution of total working experience of the respondents.
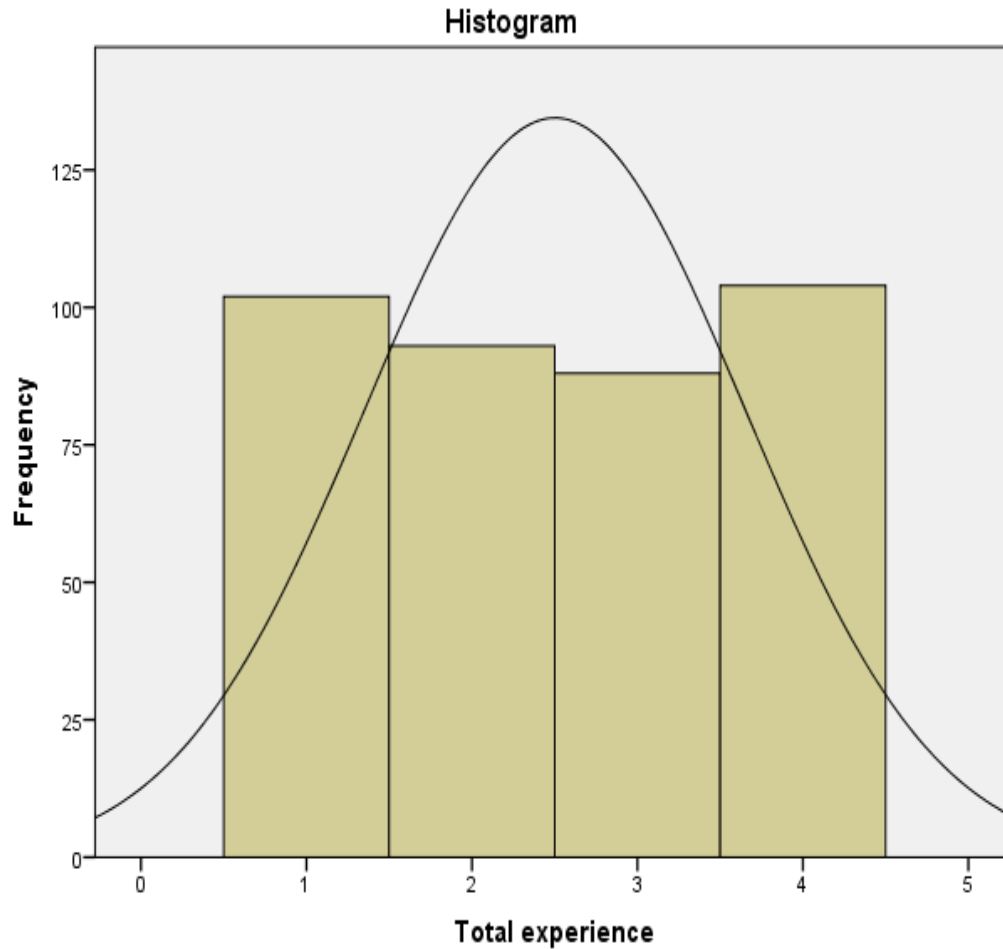
Figure 5: Histogram of Total Working Experience

Current Experience	Frequency	Percent	Cumulative Percent
0-5	97	25.1	25.1
5-10	85	22.0	47.0
10-15	96	24.8	71.8
15+	109	28.2	100.0
Total	387	100.0	

Table 6: Distribution of Working Experience in Banking Sector

The analysis realized that those who have worked for more than 15 years in their current place of work were the majority with relative frequency of 28.2% followed by 0-5 years with 25.1%. The other current working experiences were: 10-15 years of experience with 24.8% and lastly those with more than 5-10 years of current place experience at 22.0%. The histogram below shows the current working experience of the respondents.
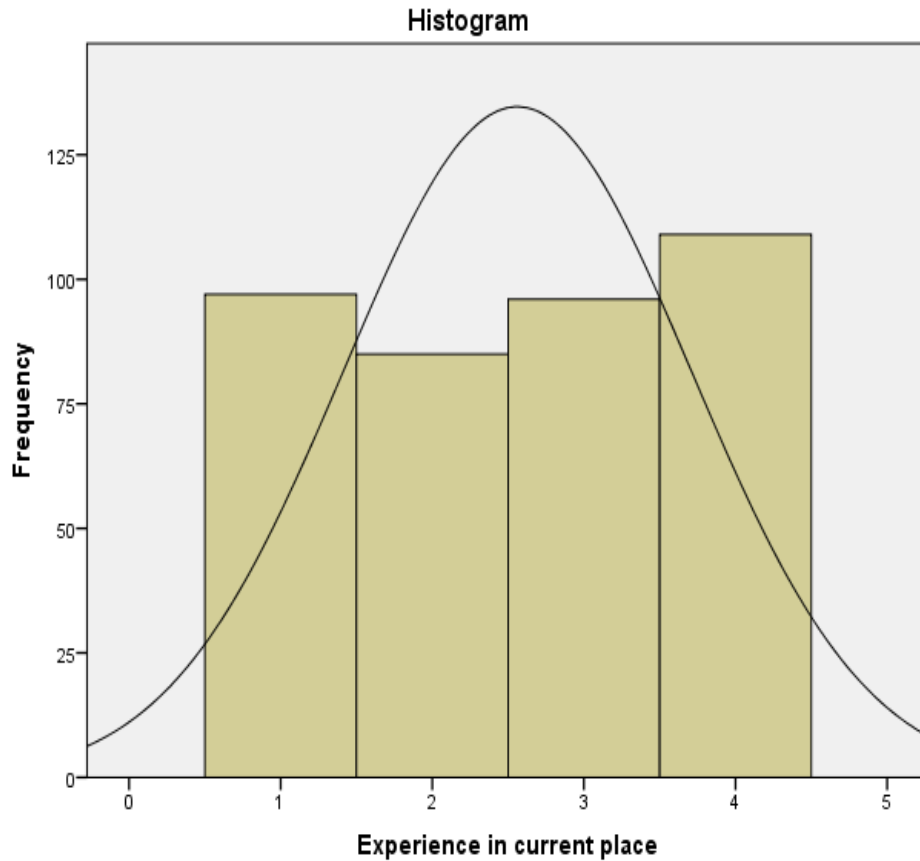
Figure 6: Histogram of Current place Working Experience

4.3 TEST OF HYPOTHESES

Hypothesis 1: Effect of Leadership Skills on the Rhetoric of Human Capital Development

In finding the effect on whether leadership skills distort the rhetoric of human capital development with specific reference to Distance Education Institutions in TamilNadu, India. The following hypothesis was tested using principal component analysis.
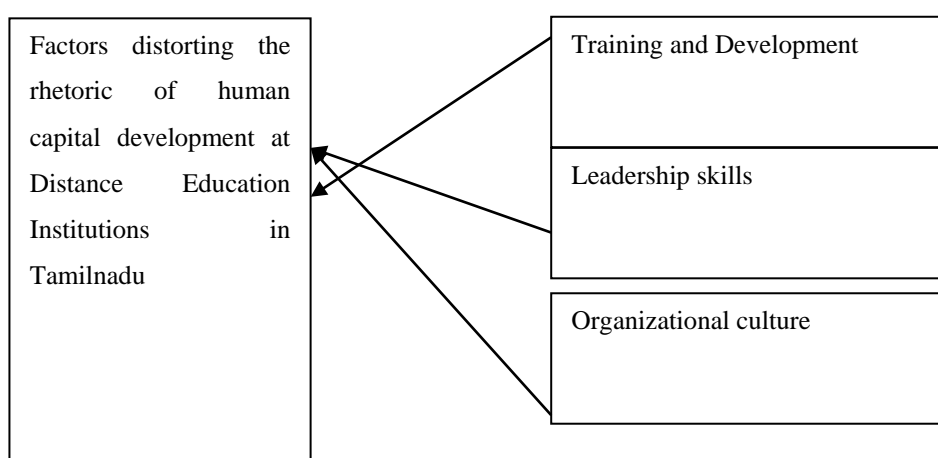
- **Null Hypothesis**: Leadership skills do not distort the rhetoric of human capital development with specific reference to Distance Education Institutions . Against;
- **Alternative Hypothesis**: Leadership skills distort the rhetoric of human capital development with specific reference to Distance Education Institutions

Factor investigated	Principal Components				
	1	**2**	**3**	**4**	**5**
Articulating a vision Factor 1	-.718				
Articulating a vision Factor 2	.574				
Articulating a vision Factor 3	.653				
Articulating a vision Factor 4	.744				
Articulating a vision Factor 5	.409				
Overall articulating vision effect	**.635**				
Providing an appropriate model Factor 1		.656			
Providing an appropriate model Factor 2		.584			
Providing an appropriate model Factor 3		. 621			
Overall Providing an appropriate model effect		**.620**			

Fostering the acceptance of group goals Factor 1				-.613		
Fostering the acceptance of group goals Factor 2				-.429		
Fostering the acceptance of group goals Factor 3				-.691		
Fostering the acceptance of group goals Factor 4				-.445		
Overall Fostering the acceptance of group goals effect				**-.545**		
High performance expectations Factor 1					.711	
High performance expectations Factor 2					.645	
High performance expectations Factor 3					.829	
Overall High performance expectations effect					**.728**	
Individualized support Factor 1					-.545	
Individualized support Factor 2					-.430	
Individualized support Factor 3					-.522	
Individualized support Factor 4					-.468	
Overall Individualized support effect					**-.491**	
Intellectual stimulation Factor 1						.530
Intellectual stimulation Factor 2						.656
Intellectual stimulation Factor 3						.461
Overall Intellectual stimulation effect						**.549**
% Variance explained	26.23	20.87	16.07	14.00	12.51	10.32
Overall Factor Loading (r)	0.635	0.620	-0.545	0.728	-0.491	0.549
Extraction Method: Principal Component Analysis.						

Table 7: Principal component analysis

The principal component analysis results shown in Table 7 demonstrate that most of the principal components (factor loadings) on leadership skills: articulating a vision, providing an appropriate model, fostering the acceptance of group goals, high performance expectations, individualized support and intellectual stimulation were greater than 0.4. This indicated that the all leadership skills' factors significantly were distorting the rhetoric of human capital development in Distance Education Institutions in TamilNadu, India. Hair *et al.* (1998) cites that, the factor loading which is 0.4 is considered moderately significant whereas a factor loading of which is greater than 50% is considered very significant.

The results show that the factor loadings for: articulating a vision(r=0.635), providing an appropriate model (r=0.620), fostering the acceptance of group goals (r=-0.545), high performance expectations (r=0.728), individualized support (r=-0.491), and intellectual stimulation (r=0.549) were almost equal or greater than 0.5. Therefore, these factors are both significant and either fairly correlated or strongly correlated to the rhetoric of human capital development in Distance Education Institutions. However, it was noted that; fostering the acceptance of group goals (r=-0.545) and individualized support (r=-0.491) inversely affected the leadership skills on the rhetoric of human capital development in Distance Education Institutions.

The principal component analysis also showed that; articulating a vision major contributor of leadership skills on the rhetoric of human capital development with 26.23% followed by, providing an appropriate model factor with 20.87%, fostering the acceptance of group goals factor with 16.07%, high performance expectations factor with 14.00%, individualized support factor with 12.51%, and finally intellectual stimulation at 10.32%.

Since the factor loadings are at least equal or greater than 0.5, the null hypothesis is rejected and the study concludes that the Leadership skills distort the rhetoric of human capital development with specific reference to Distance Education Institutions in TamilNadu, India.

Hypothesis 2: Effect of Organization Culture on the Rhetoric of Human Capital Development

In finding the effect on whether organization culture distorts the rhetoric of human capital development with specific reference to Distance Education Institutions in TamilNadu, India. The following hypothesis was tested using principal component analysis.

- **Null Hypothesis**: Organization culture does not distort the rhetoric of human capital development with specific reference to Distance Education Institutions. Against;
- **Alternative Hypothesis**: Organization culture distort the rhetoric of human capital development with specific reference to Distance Education Institutions

Factor investigated	Principal Components			
	1	**2**	**3**	**4**
Family orientation / Loyalty Factor1	.723			
Family orientation / Loyalty Factor2	.592			
Family orientation / Loyalty Factor3	.449			
Family orientation / Loyalty Factor4	.750			
Family orientation / Loyalty Factor5	.439			
Overall family orientation / Loyalty Factor	**.591**			
Open communication Factor 1		.445		
Open communication Factor 2		.616		
Open communication Factor 3		.727		
Open communication Factor 4		.404		
Overall open communication Factor		**.548**		
Team approach factor 1			-.530	
Team approach factor 2			-.591	
Team approach factor 3			-.462	
Overall team approach factor			**-.528**	
Knowledge of managers factor 1				.379
Knowledge of managers factor 2				.726
Knowledge of managers factor 3				.636
Overall knowledge of managers factor				**.580**
% Variance explained	32.14	26.78	22.16	18.92
Overall Factor Loading (r)	0.591	0.548	-0.528	0.580
Extraction Method: Principal Component Analysis.				

Table 8: Principal component analysis

The results shown in Table 8 demonstrate that most of the principal components (factor loadings) on organization culture: family orientation / loyalty, open communication, team approach and knowledge of managers were greater than 0.4. This indicated that the all organization culture factors significantly were distorting the rhetoric of human capital development in Distance Education Institutions in TamilNadu, India.

The results show that the factor loadings for: family orientation / loyalty (r=0.591), open communication (r=0.548), team approach (r=-0.528) and knowledge of managers (r=0.580)

These factors are both significant and strongly correlated to the rhetoric of human capital development in Distance Education Institutions. However, it was noted that; team approach with factor loading (r=-0.528) inversely influences the organization culture on the rhetoric of human capital development in Distance Education Institutions.

The principal component analysis also showed that; family orientation / loyalty was a major contributor of organization culture on the rhetoric of human capital development with 32.14% followed by, open communication factor with 26.78%, team approach factor with 22.16% and knowledge of managers factor with 18.92%.

Since the factor loadings are at least equal or greater than 0.5, the null hypothesis is rejected and the study concludes that the organization culture distort the rhetoric of human capital development with specific reference to Distance Education Institutions in TamilNadu, India.

Hypothesis 3: Effect of Training and Development on the Rhetoric of Human Capital Development

The effect of training and development on the rhetoric of human capital development with specific reference to Distance Education Institutions in TamilNadu, India was analyzed using principal component analysis. The hypothesis tested is;

- **Null Hypothesis**: Training and development does not distort the rhetoric of human capital development with specific reference to Distance Education Institutions. Against;

- **Alternative Hypothesis**: Training and development distort the rhetoric of human capital development with specific reference to Distance Education Institutions

Factor investigated	Principal Components		
	1	**2**	**3**
Learning performance factor 1	.565		
Learning performance factor 2	.815		
Learning performance factor 3	.856		
Learning performance factor 4	.808		
Overall learning performance factor	**.761**		
Individual Performance factor 1		.892	
Individual Performance factor 2		.906	
Individual Performance factor 3		.547	
Overall individual Performance factor 1		**.782**	
Organizational performance factor 1			-.574
Organizational performance factor 2			-.558
Organizational performance factor 3			-.562
Overall organizational performance factor			**-.565**
% Variance explained	**55.62**	**28.86**	**15.52**
Overall Factor Loading (r)	**0.761**	**0.782**	**-0.565**
Extraction Method: Principal Component Analysis.			

Table 9: Principal component analysis

According to results in Table 9, most of the principal components (factor loadings) on organization culture: learning performance, individual performance and organizational performance were greater than 0.5. This indicated that the all the training and development factors significantly were influencing outcome of the the rhetoric of human capital development in Distance Education Institutions in TamilNadu, India.

The results show that the factor loadings for: learning performance (r=0.761), individual Performance (r=0.782) and organizational performance (r=-0.565). These factors are both significant and strongly correlated to the rhetoric of human capital development. However, it was noted that; organizational performance with factor loading (r=-0.565) inversely influences the training and development on the rhetoric of human capital development in Distance Education Institutions.

The principal component analysis also showed that; learning performance was a major contributor of training and development on the rhetoric of human capital development with 55.62% followed by individual Performance factor with 28.86% and organizational performance factor with 15.52%.

Since the factor loadings are at least equal or greater than 0.5, the null hypothesis is rejected and the study concludes that the training and development distort the rhetoric of human capital development with specific reference to Distance Education Institutions in TamilNadu, India.

5. Discussion

From the research study it has been evident that human capital is considered to be a significant factor in the distance educational sector for delivering high quality educational services. The test of three hypothesis revealed that Leadership skills distorted the rhetoric of human capital development with specific reference to Distance Education Institution in Tamilnadu. The second hypothesis tested using principal component hypothesis was regarding the effects of organization culture on distorting the rhetoric of human capital development. As the p value was greater than 0.5 the null hypothesis was rejected and the alternate hypothesis was accepted, proving that organization culture distorted the rhetoric of human capital development with specific reference to Distance Education Institutions.

The third hypothesis that was tested in the study was regarding the effect of training and development on the rhetoric human capital and the results revealed that training and development indeed created an impact of the rhetoric of human capital development with specific reference to Distance Education Institutions under consideration..

6. Conclusion and Future Scope

Human capital is undoubtedly an important resource in the development process of the organization and it also plays a significant role in the economic growth and also contributes in reducing social evils like poverty, deprivations and reducing the economic disparity in India. Educational institutions are the key organizations behind the success of any country's citizens in the global arena. Distance education institutions are increasing in number in India in the recent times due to the high demand for pursuing higher education by working professionals across the nation. A rapid growth in the distance education sector has necessitated the need for institutions in adapting efficient human resource management strategies. This study makes it clear that training and development, leadership and organizational culture act as important factors in distorting the rhetoric of human capital development with respect to distance educations at Tamilnadu, India. This research has given an insight on the factors that distort the rhetoric of human capital development and management within Distance Education institutions which in turn will help them in enhancing their quality of education through better human resource management practices. The study which in the present context conducted with specific reference to Tamilnadu in future could be extended with respect to other educational institutions across India and can be even compared for identification of new factors that this study has left out to address.

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BENEFITS OF CURRENT EDUCATIONAL TECHNOLOGY: A COMPARISON OF STUDENT AND TEACHER PREPARATIONS IN A RURAL ILLINOIS SCHOOL DISTRICT

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ABSTRACT

With an ever-increasing push towards educational technology use, much emphasis has been placed on the implementation of technology programs in today's classrooms. The purpose of this study is to identify and compare teacher and student perceptions of educational technology use in a small, rural school district in central Illinois. Participants were asked to complete an electronic survey to collect quantitative and qualitative data about their perceptions of educational technology in the school district. Via a combination of descriptive analyses and independent sample t-tests, data was compared across school buildings and between student and teacher samples. It was determined that there are not currently major discrepancies between teacher and student perceptions of educational technology use in the participating district. Results have implications for only this school district suggests that district officials do not need to alter policies or practices regarding educational technology at this time.

INTRODUCTION

Unlike a few decades ago, when it was common for classroom technology to be limited to a single overhead projector and a shared television on a rolling cart, the quantity of devices currently available for use in an educational setting is staggering. In 2010 the National Center for Educational Statistics reported that over 95% of classrooms possessed at least one computer and almost all of these computers had internet access. In the few years since the collection of this statistic, there is no doubt that there has been an increase in the availability of devices for use in the classroom as large quantities of school districts throughout the United States have shifted to employ a 1:1 student to device environment. The far-reaching utilization of devices, such as laptops, tablets, and mobile technologies, is redefining the roles of both students and teachers throughout the learning process and are having a dramatic impact on the field of education.

Also altered by national initiatives, such as the implementation of the Common Core State Standards during the 2013-2014 school year and the correlating Partnership for Assessment of Readiness for College and Careers (PARCC) assessment, the teaching, learning, and assessment processes are growing increasingly dependent on the use of technology in an educational setting. National content standards, such as the Common Core State Standards (2010), Next Generation Science Standards (2013), and the C3 Framework for Social Studies State Standards (2013), all have technological elements embedding within. In order to fully meet the educational goals listed in these standards, the use of technology in the classroom setting is necessary. In an attempt to help schools across the United States finance the procurement of devices and improve their internet connections, various federal programs, such as the Investing in Innovation Fund (2009) and the ConnectED Initiative (2013), have been implemented.

Illinois, too, has taken many steps to ensure that technology is being utilized in classrooms in a way that benefits students. Since 2002 Illinois has suggested adherence to the National Educational Technology Standards (NETS) set for teachers, students, and administrators by the International Society for Technology in Education (ISTE). The adoption of the NETS by the state suggests that there is an emphasis on student growth in six areas of technology competency and that all Illinois schools will help students to meaningfully use devices in a manner that encourages the acquisition of 21st century skills. In supporting Illinois school districts, the Learning Technology Centers of Illinois have aimed to provide services and coaching since 1995 and attempt to address the expanding technological needs of Illinois schools as we progress further into the 21st century (2014).

In keeping with national and state trends, school districts have had to make significant efforts to provide devices and internet connections to students for use during the learning process (Project Tomorrow, 2015). This study's research site, a rural, public school district in Central Illinois, is no exception to this trend. Since the beginning of the 2013-2014 school year, this school district has made great attempts to ensure that the use of educational technology has

been a priority. Among these efforts the school district has worked directly with a consulting firm, offered over 20 professional development opportunities to teachers ranging from kindergarten to high school, has offered $20,000 in iPad grants to district employees, and has added two computer labs and various additional wireless routers throughout district buildings (J. Baughman, personal communication, September 2, 2015). Additionally, grades five and up utilize a BYOD (Bring Your Own Device) policy to make up for the fact that the district is currently unable to facilitate a 1:1 student to laptop environment.

With such an emphasis on technology, there has been very little comparison of teacher perceptions of technology use and student perceptions of the teaching and learning processes, particularly on a district-by-district basis. Districts, like study's research site, are addressing ISTE standards, but are left to wonder if teachers' day-to-day technology efforts and the district's initiatives are as beneficial to students as is hoped. This study is intended to highlight discrepancies in teacher and student views of educational technology use and benefits in the school district school district through addressing the following research questions:
1. How are students and teachers utilizing technology in the classroom setting?
2. How do student perceptions of technology in the district compare to teacher perceptions?

While much emphasis is being placed on increased technology use and teacher professional development, little has been done in the district to gauge if students feel they are benefitting from these initiatives. The results of this study will be of interest to teachers, particularly in grades 5-8, of the participating school district and can be used to identify technological gaps that are occurring in the district. Additionally, results will allow district officials to determine whether or not the technology initiatives are yielding the desired academic benefits for students.

METHDOLOGY
This study will employ a mixed methods design. Via an online questionnaire, students and teachers will respond to a series of both quantitative and qualitative questions about the availability of technological devices in the classroom setting as well as their perceptions of the use of such devices. A mixed methods design is chosen for the study as both quantitative and qualitative data will be collected through participant completion of the electronic questionnaire. In particular, a mixed method approach, combining both quantitative and qualitative data, has been chosen because of the necessity to quantify student and teacher perceptions for comparison.

Participants
The participants for this study consist of teachers and students from a rural school district in Central Illinois. This school district is composed of three schools, employs 65 certified teachers, and serves approximately 805 students (Illinois Report Card, 2014). Of the three district schools, this study will only be conducted in the elementary school and junior high school. Both of these schools serve primarily Caucasian students, at 95%, and approximately 25% of the students in both schools are considered low income students (Illinois Report Card, 2014). The elementary school serves students in Pre K to sixth grade while the junior high consists solely of seventh and eighth graders.

For this study 30 elementary students, 15 from fifth grade and 15 from sixth grade, were invited to participate. These students were randomly selected from the three distinct classes at teach grade level. As there are 120 students enrolled in fifth and sixth grade at the elementary school, this sample represents almost one fourth of the student population. Similar to the student sample at the elementary school, 30 students from the junior high school were also invited to participate in this study to represent the 130 students enrolled.

In addition to students, this research study also includes teachers from the district. In the elementary school setting all classes are self-contained and these teachers are responsible for the delivery of all core content. Five classroom teachers, three from fifth grade and two from sixth grade, were invited to participate in this study. Unlike the elementary school setting, the junior high building is departmentalized by content area. All five of the junior high content area teachers were invited to participate in the study.

Ethical Considerations
Informed consent will be obtained from all participants of this research study. Teachers have been assured that their individual responses will not be provided to administrators and will have no impact on their evaluation process. Students have also been informed that their participation is completely voluntary and that there will be neither academic reward nor punishment should they choose not to participate. Participants have all been informed that their questionnaires will be anonymously submitted.

Because of the small size of the district and sample, particularly among teachers, there is a risk that teachers will be hesitant to provide truthful information on this questionnaire. Additionally, teachers may feel obligated to participate, even if they do not truly desire to, because the researcher is a member of the teacher population that will be included in this research.

Instrumentation
Participant responses will be collected via an electronic questionnaire that will be distributed via district issued email accounts. Two versions of the questionnaire will be utilized, one for teachers and one for students. While these two versions will be essentially the same, some language will need to be altered to reflect the roles the participants play in the classroom. Both surveys have been validated by a Panel of Experts.

The questionnaire will contain a series of yes/no, closed ended questions and various Likert scale items. The yes/no questions, asking about availability of technology in various locations, will permit the comparison of resources available outside of school setting to both teachers and students. The 19 Likert scale questions, used to identify participant perceptions of educational technology, will require participants to indicate their levels of agreement on scale ranging from 1 to 5. The Likert scale being utilized throughout the entire survey addressing attitudes towards technology in the classroom will range from 1: strongly disagree, 2: disagree, 3: neither disagree nor agree, 4: agree, to 5: strongly agree.

These questions, meant to gauge student and teacher attitudes toward technology use in an educational setting, are separated into two categories. The first category deals with students' attitudes of technology availability, instruction, and teacher knowledge in the participating school district. The second category of Likert scale questions is meant to identify student and teacher attitudes towards technology and the learning process. With a focus on student learning, this section of both the student and teacher surveys will require participants to rate their level of agreement from strongly disagree to strongly agree with statements such as "students want to participate more in class when they get to use technology". The intentional inclusion of only positive items during the Likert scale portions of the surveys was done to avoid inverted scoring during the data analysis process. Additionally, Solís Salazar (2015) points out that when only positive survey items are used validity and reliability are greater than in surveys where both positive and negative items are included.

Additionally, the questionnaire contains four open-ended qualitative questions. Participants will be asked to explain their thoughts and opinions on the benefits, drawbacks, concerns, and additional thoughts on technology use in district classrooms. The inclusion of these open-ended questions as part of the questionnaire process will permit data collection on participant thoughts that may go beyond the responses of the closed-ended questions.
1. What is the biggest benefit to using technology in school? Please explain.
2. Can you think of any situations where technology has prevented you from learning? Please explain.
3. What is one thing concerning technology use in the classroom that you wish our school did differently? Please explain.
4. Do you have any thoughts or concerns about our district's use of technology that you want to share?

All questions in the questionnaire are designed to identify student and teacher perceptions of educational technology use in grades five through eight so that the perceptions of student and teachers can be compared.

The only demographic data that will be collected from all participants is the building in which teachers work or students attend. This will help to identify any discrepancies across the two buildings and among the teacher and student participant groups. The teacher questionnaire will contain additional demographic items aimed to identify how long the participants have been teaching, their highest level of education, and whether or not they have participated in district provided or outside technology professional development opportunities.

Research Questions
1. How are students and teachers utilizing technology in the classroom setting?
2. How do student perceptions of technology in the district compare to teacher perceptions?

Limitations
There are several limitations to this study. First, this research study was only conducted at one school district in central Illinois and therefore results will likely only be applicable to this particular school district. Additionally, the

population of students and teachers at this school, a small, rural school district, is not reflective of other districts in the area, thus the findings are not likely to be transferable. The small size of the school district also limits the number of participants available in both the teacher and student participant groups. Finally, this research relies heavily on Likert scale questions and it is often difficult to determine the validity of these scales.

Data Analysis
The questionnaire being utilized is a Google form. As participants submit their responses, they will all be populated into a Google sheet. The functionality of this web based program is very similar to Microsoft Excel and all results can be downloaded in an Excel document for analysis. The quantification of student and teacher perceptions via the Likert scale items on the questionnaire, will allow the researchers to complete a descriptive analysis of the questionnaire results. This descriptive analysis of the quantitative data collected will provide information regarding central tendencies. After this initial descriptive analysis, data will be organized by school buildings. This will permit a comparison of data between student and teacher groups. In addition, student data and teacher data will be compared as a whole and by buildings. In making these comparisons independent sample t-tests will be utilized to compare means of various questions. In analysis of the open-ended questions, recurring themes will be identified. After analysis data will be displayed and organized in tables to assist with making sense of the results.

Literature Review
The increase in availability of devices and the push from both state and federal organizations has prompted a dramatic expansion of school districts' technological infrastructures. Through the ConnectED initiative, President Obama (2014) has issued a "challenge to connect 99% of students to next-generation connectivity within five years". Due to this and the wide support the ConnectED initiative has obtained, there is no doubt that there will continue to be an increase in device quantities and the access to reliable internet for students both in and outside of the classroom setting.

Such drastic changes in the educational world general elicit quite a bit of research. Four main categories related to technology integration can be identified and related to this study; they are one-to-one programs, the use of mobile devices in the classroom, teacher perceptions of technology integration, and student perceptions of technology use in an educational setting.

One-to-One Environments
The increased availability of technology has led to an increase in the availability of technological devices in the classroom setting. Because of this, many school districts have implemented a one-to-one student to laptop program. Such an increase in these programs has permitted quite a bit of research to be conducted on the effects of one-to-one implementation in the school setting. Of the benefits identified, one is increased access to word processing tools, research materials, and the ability to collaborate with among teachers and students. These are all skills that correlate with the ISTE student standards that are meant to help students to "learn effectively and live productively in an increasingly global and digital society" (ISTE, 2007). Additionally, one-to-one programs have the potential to positively affect learning environments and transform learning communities so that they are more learner-centered (Dunleavy, Dexter & Heinecke, 2007). Team building activities and student collaboration can be significantly enhanced through one-to-one implementation. Particularly in the middle school setting, one-to-one implementation supports the commonly utilized middle school model via the creation of team environments and encourages frequent interdisciplinary assignments and projects (Downes & Bishop, 2015). Because they encourage collaboration and provided for many means of communication, one-to-one programs can play a significant role in helping to establish a positive learning community (Downes & Bishop, 2015).

Despite the many benefits of implementing a one-to-one program, particularly in the middle school setting, there are many misconceptions of these programs. Many believe that one-to-one implementation automatically leads to better teaching and learning experiences, but this is not the case. One-to-one programs can serve as a means to transform teaching and learning process, but teachers and administrators must actively seek to transform classroom practices. The teaching and learning environments created by one-to-one implementation must be accompanied by practices of technology immersion in order to yield significant positive results. The use of one-to-one programs alone does not ensure technological superiority over other programs. Laptops have the potential to add value to the teaching and learning processes, but also have the potential to create classroom management issues (Dunleavy, Dexter & Heinecke, 2007). This potential is only unlocked when teachers and students are able to utilize the devices in a manner that does more than substitute laptops for paper and pencil assignments.

Mobile Device Use
It's no surprise that the increase in availability of mobile devices is affecting today's students and the ways in which they learn and interact with the world outside of the classroom setting. In 2013 it was estimated that approximately 65% of students in the United States grades six through eight routinely use smartphones (Project Tomorrow, 2013). Despite this increase in technology use outside of the school, many schools discourage the use of student-owned mobile devices in the classroom setting (Rivero, 2013). While this may currently be the norm, there are schools that are defying this trend and have implemented 'Bring Your Own Device' (BYOD) policies so that students have access to a technological device, particularly when the school does not have the means to adopt a one-to-one policy.

It has been suggested that the implementation of such policies, as opposed to one-to-one, has the potential to positively affect the teaching and learning process. The use of student-owned devices suggests increased student comfort with technology. As students increasingly use mobile devices outside of the classroom, it has been found that students who use personal mobile devices in the classroom report a higher level of comfort with the devices and applications for educational purposes. This is due to the fact that students who use their own mobile devices in the classroom are able to connect their knowledge of technology across multiple settings and can apply technological knowledge they acquired outside of the classroom setting to their learning (Swan, Van't Hooft, Kratcoski, & Unger, 2005). In addition to this increased transfer of technological knowledge, BYOD policies seen to increase student engagement and collaboration (Rivero, 2013). Mobile applications and access to online learning management systems (LMS) encourage students to work together and increase their nonlinguistic communication skills in and out of the classroom setting (Nielsen & Webb, 2015). This increased collaboration is not hindered because of the differences in student devices and generally relies on browser-based programs and applications that can be accessed by most devices (Raths, 2013).

Despite these benefits, the use of mobile devices in the classroom presents various obstacles to be overcome by teachers, administrators, and students. While the majority of students today have access to a mobile device, the use of a BYOD policy has the potential to draw attention to low income students, without devices and can expand any technology or learning gaps that already exist between them and their peers (Bruder, 2014). Additionally, the smaller size of mobile and other handheld devices presents a potential classroom management problem as students may be tempted to use the devices for non-school related activities and communications during the school day. In particular, this provides students with the opportunity to find ways around technology security settings to access social networking sites during the school day. This then has the potential to contribute to cyberbullying and other behavioral concerns throughout the school day (Bruder, 2014). Furthermore, the use of student-owned mobile devices creates an environment where devices have different functionalities and presents issues for teachers when it comes to problem solving with devices, particularly when they are unfamiliar with specific devices and their properties.

Teacher Perceptions of Technology
As with any change made to the teaching and learning processes, educational technology has elicited a variety of teacher perceptions. In particular, teachers have reported initial resistance and discomfort with changes related to technology implementation (Donovan, Hartley, & Strudler, 2007). Technology implementation is often perceived as a risky decision that reflects teachers' personal opinions of technology use. Teachers who have positive perceptions of one-to-one technology use are more likely to embrace the technological shift and attempt to utilize the devices with students. Similarly, teachers who feel negatively about technology or are concerned about the devices being distracting to students are more likely to avoid use of the devices (Howard, 2011). While a variety of positive teacher perceptions towards technology integration are often reported, negative perceptions are often overlooked and disregarded.

Regardless of teachers' initial opinions of technology implementation, it seems as if professional development related to technology has the potential to dramatically alter teacher perceptions of the implementation process. Teachers believe that they need opportunities to learn about ways in which instruction and assessment and classroom management procedures can be adjusted in order to effectively establish a classroom setting where technology is valuable to both them and students (Dunleavy, Dexter & Heinecke, 2007). The availability of professional development, whether offered by a school district or sought out by independent teachers, seems to be vital for the success of any technology program's implementation (Howard, 2011).   These professional development opportunities are necessary for teacher support of technology implementation and is supported by Thornburg's

(2014) statement that, "We make a big mistake when we think the new tools, by themselves, impact learning" (p. 30).

Even with sufficient professional development, teachers still have various concerns about using technological devices in the classroom. These concerns generally fall into two categories: technical and hardware concerns and classroom management matters. The first of these categories, technical and hardware concerns, deals primarily with teachers' perceptions that they are unable to fix devices or problem solve technical issues upon their occurrences. These concerns suggest a need for building or district wide technical support and routine device maintenance. Additionally, teachers worry about the logistics of wide-scale technology implementation in the classroom and whether or not devices batteries can last for an entire school day. For example, the locations of outlets in classrooms and how access to these energy sources may interfere with students' abilities to complete classroom assignments is a source of concern for teachers (Dunleavy, Dexter & Heinecke, 2007).

The second category of teacher concerns deals with the implications on classroom management procedures. Teachers recognize that the use of technological devices in the classroom adds another complex component to managing students' behavior and progress on assignments. Utilization of laptops or mobile devices in the classroom setting provides students access to a plethora of learning tools, but also has the potential to provide distractions and disruptions during the teaching and learning processes. In particular, the increased reliance on or availability of internet search engines gives students access to materials that are neither appropriate nor relevant to their coursework (Dunleavy, Dexter & Heinecke, 2007). This becomes an issue for all teachers, especially if teachers already struggle with classroom management, and is just one more aspect of student management to consider on a daily basis. Additionally, this suggests the need for schools, particularly those utilizing a BYOD policy, to create and enforce a set of rules for technology use in the classroom (Bruder, 2014).

Student Perceptions of Technology

As implementation of any technology program affects students' roles as learners and members of the classroom community, it is important to identify students' perceptions of technology use in the classroom. Seeing as today's students, particularly middle school aged students, have never experienced life without cellphones, laptops, and tablets, it is no surprise that students mostly report positive perceptions of technology use in the educational setting.

Students claim that using technology in class increases their engagement and desire to participate. This is due to the fact that students enjoy using technology, but is also due to the fact that students have increased comfort with technological devices because of their interactions with technology outside of the school setting. In describing students' comfort and desire to utilize technology in the classroom, it is reported that "75% of students think every student should have access to a mobile device during the school day to support learning" (Project Tomorrow, 2014). Students' positive attitudes towards this technology seem to influence the fact that they report low levels of anxiety when using tablets and other handheld devices in the classroom (Gorhan, Oncu, & Senturk, 2014).

Students have also reported that using technology gives them more ownership of their learning and allow them to be active participants in teaching and learning process, unlike settings where they cannot use devices (Baytak, Tarman & Ayas, 2011). The utilization of technology provides students with opportunities to demonstrate their learning and apply skills in ways that are not easily done with pencils and paper. Often times this new flexibility leads to increased creativity in the classroom and can bridge core content areas and the fine arts in a way that, again, intensifies students' engagement in the learning process (Vaidyanathan, 2012).

Despite their overwhelming positive perceptions of technology use in the classroom, studies suggest that students acknowledge the devices are only a resource for their learning, much like a calculator is a resource in math or textbooks have assisted in core content areas. Students see these devices not as their source of knowledge and learning, but as tools that can help them through the learning process (Swan, Van't Hooft, Kratcoski, & Unger, 2005). Most significantly, students have reported that they realize that it is the teachers and administrators who create their learning environments, not the use of technological devices, which have had the most influential impact on their perceptions of educational technology (Prettyman, Ward, Jauk, & Awad, 2012).

Results

Through the collection of both quantitative and qualitative data via electronic surveys, this study utilized a mixed method design. Two different versions of an electronic survey were distributed to teachers and students within the

participating school district. The purpose of this study was to identify middle school student and teacher perceptions of technology use in this School District. Both versions of the surveys were split into five sections to gather data about student and teacher attitudes and opinions of technology use in this particular school district. These five sections are: (1) demographics, (2) device availability at home and school, (3) attitudes towards technology in school, (4) attitudes towards technology and learning, and (5) open responses.

Participant Demographics

Of the 10 teachers that were asked to participate in the study, 9 completed the electronic survey. The teacher participant population was comprised of 56% elementary school teachers and 44% junior high teachers. Data table 1 highlights additional demographic information of the teacher participant population, such as participants' years of experiences and highest level of education. The collection of teacher demographics also allowed teachers to communicate whether or not they have participated in professional development related to technology over the past two years. It was discovered that 100% of teacher participants have participated in technology professional development offered by the school district. It was also found that 44% of the teacher participants have participated in technology related professional development outside of the school district.

Data Table 1: Teacher Participants' Demographics in a Central Illinois School District

Category	Number
Building of Employment	
Elementary School	5
Junior High School	4
Years of Experience	
0-4	2
5-9	3
10-14	1
15-19	0
20-24	2
25+	1
Highest Level of Education	
Bachelor's degree	6
Master's degree	3
Doctorate degree	0

In addition, 30 elementary school students and 40 junior high school students were asked to participate. A total of 50 students, 22 elementary students, 26 junior students, and 2 students whom did not identify their school, participated by completing the electronic survey. In looking at the student participants, table 2 illustrates that 52% of student participants were from the junior high building while 44% were from the elementary school.

Data Table 2: Which school building do you currently attend?

Students Participants' Building of Attendance	
	Percent
Elementary School	44
Junior High School	52
Undeclared	4

The second section of the student and teacher surveys permitted participants to identify the types of devices they have access to at home and in the school setting. Through a series of "Yes/No" questions, participants were able to list what types of technology they have access to at home and throughout the course of the school day. Comparison of the types of devices that are available to teachers and students has the potential to explain discrepancies in teacher and student perceptions of technology use in school. Data Table 3 shows that teachers all have access to internet access, wireless internet access, and laptop computers at home and in the workplace. The table does identify some differences in the availability of cell phones, tablets, and desktop computers between these two settings.

Data Table 3: Teacher Device Access at Home vs. School

Teacher Device Access		
	Home	**School**
Internet Access	100.00%	100.00%
Wireless Internet Access	100.00%	100.00%
Cell Phone	100.00%	55.56%
Tablet (iPad, Nook, Kindle, etc.)	100.00%	88.89%
Laptop Computer	100.00%	100.00%
Desktop Computer	66.67%	77.78%

Similar to Data Table 3, Data Table 4 shows what devices students have at home and in the classroom setting. Student participants, like the teachers, have almost identical access to internet access, wireless internet access, and laptop computers in both the home and school settings. Student data echoes the teacher data regarding differences in access to cell phones, tablets, and desktop computers across the home and school settings. Within the student participant population there is quite a difference in access to cell phones in a school setting depending on which school building students attend. Students at the junior high reported 76.92% access to cell phones at school while student in the elementary building only reported 40.91% access to cell phone access during the school day. As students among the two buildings have similar access to cell phones at home, this is in school difference is likely due to the fact that the fifth grade, located in the elementary school building, has not yet adopted the BYOD policy that grades 6 through 8 currently have in place in their classrooms. Decreased access to tablets in the classroom setting, compared to the home setting, can also be explained by the fact that tablets are distributed to teachers in our district based on a highly competitive grant system that has only been in place for a few years.

Data Table 4: Student Device Access at Home vs. School

Student Device Access		
	Home	**School**
Internet Access	98.00%	98.00%
Wireless Internet Access	92.00%	90.00%
Cell Phone	76.00%	62.00%
Tablet (iPad, Nook, Kindle, etc.)	84.00%	76.00%
Laptop Computer	92.00%	98.00%
Desktop Computer	52.00%	92.00%

Attitudes towards Technology in School
The third section of the survey, questions 5 through 13, dealt with participants' attitudes towards technology in the school. These 9 items were Likert scale items and **participants** rated their agreement or disagreement with statements regarding technology in school on a scale of 1 to 5. Data Table 5 compares the means and standard deviations of each of these Likert items. As students and teachers within this school district have access to similar devices, it was assumed prior to data collection that there would be no difference in the means of the participant responses for each of the items in this section from the survey. In particular, the means of questions 7, 8, 10, and 11 are quite close. This suggests that student and teacher perceptions are similar concerning the amount of new technology learning completed in the school building, teachers' abilities to instruct better when utilizing technology, teachers' abilities to assist students struggling with technology difficulties, and teachers' knowledge of how to use technology for learning purposes.

Data Table 5: Attitudes towards Technology in School

Attitudes towards Technology in School		
	Students	**Teachers**
Question 5		
N	50	9
Mean	4.30	3.44
S. Deviation	0.89	1.01
Question 6		
N	50	9
Mean	4.18	2.33
S. Deviation	1.04	0.87
Question 7		
N	48	9
Mean	3.85	3.33
S. Deviation	1.13	0.87
Question 8		
N	50	9
Mean	4.00	4.11
S. Deviation	0.88	0.93
Question 9		
N	50	9
Mean	3.02	2.11
S. Deviation	1.13	0.33
Question 10		
N	50	9
Mean	3.92	3.67
S. Deviation	0.83	0.71
Question 11		
N	50	9
Mean	3.72	3.33
S. Deviation	1.01	0.87
Question 12		
N	50	9
Mean	4.12	4.67
S. Deviation	0.63	0.50
Question 13		
N	50	9
Mean	2.56	3.33
Standard Deviation	0.97	0.87

While many of these means are close, it is not the case for all of the Likert items within this section of the survey. Figure 1 helps in identify the questions whose means differ greatly. As shown, questions 5, 6, 9, and 13 vary by more than 0.75. As is clear by looking at Figure 1, student and teacher perceptions vary when concerning the availability of devices for students to use during the school day, students' acquisition of keyboarding skills in school, the amount of total technology learning that has taken place in the school, and who is best able to problem solve and/or fix technology problems.

Figure 1: Student & Teacher Attitudes towards Technology in School
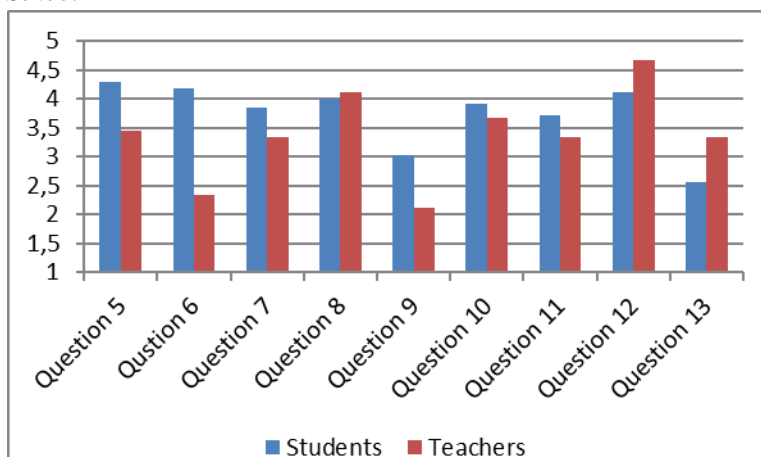
When comparing the data for this particular section of the survey, a paired t-test was run to compare the means of the items. As the t-value was 1.39 and was smaller than the critical value of 2.30 the null hypothesis, that the means were the same, can be rejected. This means that there is a statistically significant difference in the means of the data points from this section of the research survey and that the attitudes of students and teachers regarding technology in school do vary as a whole category.

Attitudes towards Technology and Learning
The fourth section of the survey, similar to section three, was utilized to gauge participant attitudes. In this particular case, the Likert scale items from this portion of the survey were intended to gauge participants' attitudes towards technology and learning. Figure 2 shows the differences between student and teacher means for questions 14 through 23. As can be seen in the figure and verified in Data Table 6, the means of questions 17, 19, 20, 22, and 23 were very similar. This suggests that teacher and student perceptions are similar regarding students' opinions of using their own devices in the classroom, the learning that could be done without the use of technological devices, improvements to student organization due to using technology, how technology complicates or simplifies tasks, and the amount of stress that technology causes students.

Figure 2: Student & Teacher Attitudes towards Technology Teaching and Learning
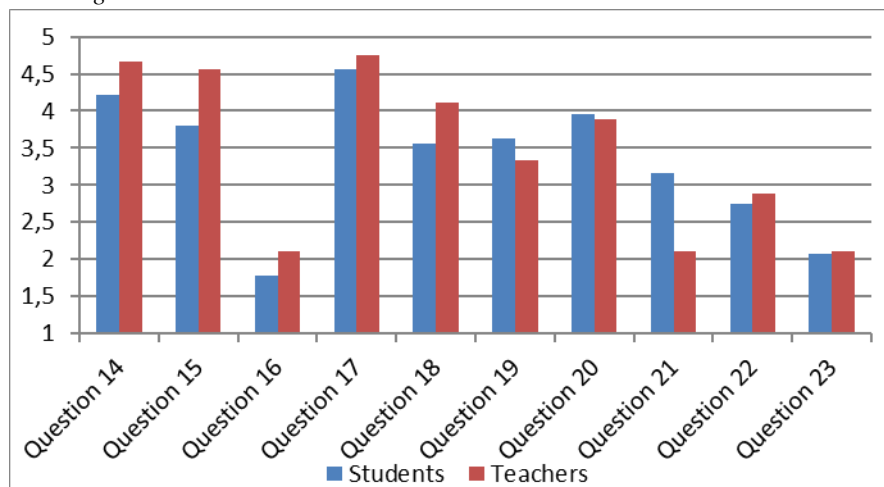
Data Table 6: Attitudes towards Technology and Learning

Attitudes towards Technology and Learning		
	Students	**Teachers**
Question 14		
N	50	9
Mean	4.22	4.67
S. Deviation	0.86	0.50
Question 15		
N	50	9
Mean	3.80	4.56
S. Deviation	1.03	0.53
Question 16		
N	50	9
Mean	1.78	2.11
S. Deviation	0.91	0.60
Question 17		
N	50	8
Mean	4.56	4.75
S. Deviation	0.79	0.46
Question 18		
N	50	9
Mean	3.56	4.11
S. Deviation	1.07	1.17
Question 19		
N	49	9
Mean	3.63	3.33
S. Deviation	0.95	0.87
Question 20		
N	50	9
Mean	3.96	3.89
S. Deviation	0.78	0.78
Question 21		
N	50	9
Mean	3.16	2.11
S. Deviation	1.08	0.60
Question 22		
N	50	9
Mean	2.74	2.89
S. Deviation	1.05	1.05
Question 23		
N	50	9
Mean	2.08	2.11
S. Deviation	1.12	0.60

There are multiple areas where the differences in the means of the student and teacher data are quite large. In particular, the data regarding questions 15 and 17 suggest differences in student and teacher thinking about how technology impacts learning. Teachers reported a larger relationship between technology use and student motivation than students reported. Additionally, there were discrepancies between student and teacher opinions concerning the statement "Students could learn just as much in class without using technology." Teachers generally disagreed with this statement and overall had an average of 2.11 while students tended to report that they "neither agreed nor disagreed" and averaged 3.16 for this item. Similar to the results of the t-Test of the section 3 data, a paired sample of means resulted in a statistically significant difference in the means of the items for this section of the survey. With a t-value of -0.64 and critical value of 2.26, it can be stated that teacher and student perceptions of the role technology can play in the learning process vary.

Open Response Questions

The final section of the survey comprised of consisted of four open response questions to be answered by the participants. As this section of the survey collected qualitative data, a theme analysis of participant responses was completed. Various key words and concepts were identified for each of the four questions in this section and student and teacher surveys were analyzed separately.

Item 1: What is the biggest benefit to using technology in school? Please explain. In review participant responses about the most significant benefit of utilizing technology in the school setting, multiple student and teacher themes appeared.   Displayed in Data Table 7, students claimed technology gives them access to a large amount of information, helps in the organization process, and is fast and easy to use. Similar to students, teachers stated that access to information is one of the largest benefits of using technology in school. In addition, teachers identify technology as a factor in increasing student motivation and declared the availability of instant feedback as useful to students and teachers throughout the learning process.

Data Table 7: Themes from Open Response Item 1.

	Frequency
Students	
Access to Information	10
Organization	9
Fast and Easy to Use	13
Teachers	
Access to Information	5
Student Motivation	3
Instant Feedback	2

Item 2: Can you think of any situations where technology has prevented students from learning? Please explain. In addressing the second open response question, 33 students and 2 teachers stated that they could not identify a situation where technology diminished student learning. Aside from this, both students and teachers listed occasions on which technology was distracting to the student learning process as examples of how technology has prevented student learning. Additionally, both groups of participants stated that device and connectivity issues have also influenced students' learning processes. One teacher stated that the use of technology has prevented students from having other learning experiences. It was suggested that some technology activities, such as researching with the internet instead of reference books, are contributing to the loss of specific learning.

Data Table 7: Themes from Open Response Item 2

	Frequency
Students	
No	33
Technology as a Distraction	8
Device/Connectivity Issues	7
Teachers	
No	2
Technology as a Distraction	1
Device/Connectivity Issues	3
Loss of Other Learning	1

Item 3: What is one thing concerning technology use in the classroom that you wish your school did differently? Please explain. When asked what they wish this particular school district changed about their use of technology in the classroom 17 of the student participants claimed there is nothing that needs to be changed.

Teacher and student participants both suggested that more devices or quicker device repairs and different device access would benefit students. For example, students and teachers suggested that the ability to print from student devices would enhance student learning.   Additionally, multiple teachers suggested that classroom laptops be replaced with Chromebooks as these devices would support the Google platform used by the entire school district. Students suggested that incorporating technology in more ways, like in math, would help student engagement and that there should me more of a focus on addressing how students are inappropriately utilizing their personal technology devices during class time. Finally, teachers suggested that there needs to be an increased focus on the development of students' technology skills, like keyboarding (See table 8).

Data Table 8: Themes from Open Response Item 3

	Frequency
Students	
Nothing	17
More Devices/Repairs	5
Different Device Access	3
Development of Tech. Skills	4
Increased Use in Classes	8
Inappropriate Use in School	8
Teachers	
More Devices/Repairs	2
Different Device Access	3
Development of Tech. Skills	
	2

Item 4: Do you have any thoughts or concerns about the district's use of technology that you want to share?
The final question on the participant surveys was an open response item that gave participants the opportunity to voice any additional thoughts or concerns about the ways technology is being used in classroom setting in grades five through eight. As shown in Data Table 9, the majority of the student participants had no additional thoughts to share. Some of the students who shared additional thoughts restated ideas identified as themes in other open response items. In particular, students stated there is a need for the replacement and repair of current district devices and that there are students who misuse the privilege to utilize technological devices in the classroom setting. Teachers, like the students, either chose not to add any additional thoughts or suggested that technology in the district could be improved through the replacement or repair of the current devices. A number of participants from both the student and teacher populations wanted to share their appreciation of the district's technology emphasis, especially for students in grades five through eight.

Data Table 9: Themes from Open Response Item 4

	Frequency
Students	
No	33
Replacement/Repair	2
Appreciate Tech. Efforts	5
Misuse of Tech. at School	5
Teachers	
No	2
Replacement/Repair	2
Appreciate Tech. Efforts	2

Discussion
The research findings of teacher and student perceptions of educational technology are quite comparable with the literature reviewed prior to the implementation of the survey. Data concerning device availability, teacher perceptions of technology, and student perceptions of technology correspond with many of the findings previously outlined in this report. Additionally, the overall lack of differences in student and teacher perceptions found in this study is unexpected.

Device Availability
In discussing perceptions of educational technology, identifying limitations and areas of concern regarding access to devices, particularly in the school setting, has the potential to explain any disparities among student and teacher populations. In the case of this particular study, BYOD surely plays a role in students' thinking about technology use in the classroom. Although 38% of students reporting that their preference is to utilize a school issued device during the school day, the majority of the student population claimed that using devices permitted by the district's BYOD policy is preferable. This aligns with the research of Swan, Van't, Hooft, Kratcoski, and Unger (2005) and suggests that students' prior knowledge of their personal devices' functionality helps them to focus on their educational tasks.

Via data analysis, it was also discovered that both the participant groups have access to similar devices across settings regardless of their status as student or teacher. To illustrate, both students and teachers reported more access to desktop computers at school than at home and this is likely explained by the placement of multiple desktop computers in each elementary classrooms and access to computer labs with desktop computers in the junior high setting. Because teachers and students have similar access to devices in the school and home settings, differences in student and teacher perceptions of educational technology are not likely related to the populations' access to various devices.

Teachers Perceptions of Technology
The overall success with the implementation of educational technology and the lack of participating teachers' discomfort is likely aided by their willingness to pursue professional development opportunities dealing with technology. Corresponding with Howard's (2011) findings dealing with the relationship between technology implementation and professional development opportunities, access to training has impacting teachers' perceptions of technology use in the classroom. Additionally, Thornburg's (2014) research supports the district's initiatives to provide learning opportunities for employees as a means of ensuring that investing in devices makes a significant, positive impact on teachers' ability to provide instruction and students' ability to learn.

The enthusiasm of participants about technology is likely due to the fact that they widely agree, with a mean of 4.67, that the whole district thinks using technology for learning is important. This positive environment, as described by Howard (2011), is presumably the reason that participating teachers were supportive of increased technology implementation throughout the district and have positive perceptions of technology use in general. In identifying barriers to such a change, teachers did point out that students primarily use technology for research and to utilize word processing tools to produce electronic documents, but, like many districts embracing the use of technological tools for educational purposes, have previously lacked a rigorous, formal keyboarding curriculum for students.

As teachers' positive perceptions of educational technology were supported by prior research, so are teacher concerns. Dunleavy, Dexter, and Heinecke's (2007) research suggests that logistics, hardware problems, and device malfunctions are an area of concern for teachers. In this particular study participating teachers remained neutral about their abilities to solve technological problems and did identify broken devices as hindrances to their capabilities to effectively make use of technology in the classroom setting. Due to the varying functionality of devices associated with the BYOD setting, it's probable such a setting negatively impacted teacher perceptions of their ability to problem solve technological issues in their classrooms. Furthermore, teacher requests to incorporate larger quantities of specific devices, in this case Chomebooks, suggest their discomfort and/or frustration with school issued and student devices that do not fully support the Google platform, which is utilized by students in grades five through eight in the participating school district on a daily basis.

Student Perceptions of Technology
The student perceptions, similar to teacher perceptions, identified through this research also parallel previously reviewed studies. Reflective of Gorhan, Oncu, and Senturk's (2014) findings, student participants reported low

levels of stress related to technology use and asserted that using technology in an educational setting is enjoyable. In fact, students communicated interest in increased technology use throughout the core content areas. Additionally, students indicated that technology use in school is assisting with more than just their assignment completion. Organization and time management were two areas students identified as being positively affected because of the use of technology in the classroom setting.

Despite the many ways in which technology is aiding students in their learning, it was reported that technology is a distraction for some students. In particular students reported in appropriate use of devices during the school day. This suggests, as does Bruder's (2014) research, that there is a need to readdress the ways in which the school district enforces rules for technology use in the BYOD setting.

Differences in Teacher and Student Perceptions
In was anticipated that discrepancies in student and teacher perceptions of educational technology would be identified through this research. While there are some minor differences in the ways that these participant groups view both technology in the participating district and technology for learning, the data indicates that students and teachers think very similarly regarding the use of educational technology in grades five through eight.

Recommendations
Because only minor differences in student and teacher perceptions of technology use in grades five through eight were identified via this research, it is suggested that no immediate modifications be made in regards to the use of educational technology within grades five through eight. The findings detailed above as well as the literature reviewed support the district's adoption of a BYOD policy in lieu of transitioning to a one-to-one device to student environment.

Additionally, strong student perceptions were identified regarding teachers' knowledge of utilizing technology for learning and their abilities to solve technological problems as they arise. Teachers' perceptions of these concepts, while not as positive as students, suggest that they are currently receiving the appropriate professional development through the district and elsewhere to meaningfully facilitate learning with the aid of technological devices in the classroom setting.

In order to maintain these beliefs as technology evolves, it recommended that the district continue to focus resources on educational technology use in grades five through eight. Frequent offering of technology related professional development opportunities and maintenance and/or replacement of outdated devices of on a regular basis will undoubtedly aid in the retention of positive teacher and student perceptions of the districts practices regarding educational technology.

Conclusion
As technology continues to evolve, so will its place in the field of education. While the results of this study are only pertinent to this school district, it is necessary for all school districts and individual educators to continuously evaluate teacher and student perceptions of their educational technology use. Regular assessment of perceptions regarding technology use in the classroom setting has the potential to drive educational decision making in a manner that best addresses the needs of students and teachers. Furthermore, such a practice would allow school districts to routinely reflect on whether or not their technology policies and practices reflect technology advancement and provides opportunities for educators to verify that students are equipped with the necessary technological skills to successfully contribute to our technology-rich society

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EXAMINING FACTORS INFLUENCING STUDENT SATISFACTION IN DISTANCE EDUCATION IN GHANA: A STUDY OF THE INSTITUTE FOR EDUCATIONAL DEVELOPMENT AND EXTENSION, UNIVERSITY OF EDUCATION, WINNEBA

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ABSTRACT
The purpose of this paper is to identify factors that influence students' satisfaction in distance education programmes in Ghana. The study used ordinal logistic regression based on a structured hardcopy questionnaire administered to 309 students of the Institute for Educational Development and Extension, University of Education, Winneba in the Volta Region campuses, Ghana. The dependent variable in the study is students' satisfaction while administrative support services, course evaluation by students, instructor performance and student instructor interaction constitute the independent variables. The logistic regression results revealed that administrative support services that focus on students, course evaluation by students, the instructor's performance and the student instructor interactions influence students' satisfaction. In addition, most of the students expressed their satisfaction in the distance education programme in the Institute for Educational Development and Extension, University of Education, Winneba.
Keywords: Distance Education, Students, satisfaction, logit model

Introduction
It is a public knowledge in Ghana that universities especially the public ones are unable to admit all the eligible applicants to their main campuses. Every academic year, the public universities report their inability to admit qualified applicants. This is due to the limited infrastructure as well as the increase in demand for university education in Ghana (Business &Financial Times online, 2015). This, the researchers believe has led to the creation of distance education programmes by universities with satellite campuses doted all over the country. The distance education programme in Ghana is unique in its own sense. Unlike the normal distance learning done purely via the internet mostly, that of Ghana has regional offices with centres headed by a coordinator and supported by administrative staff. Online supports are also given in some few instances but not extensive relative to developed countries. The study centres have classrooms where tutorials are conducted, thus, providing face-to-face interaction with students as well as some few support services from the administrative staff, an experience that may be lacking in the online system.

Ali & Ahmad (2011), reports that according to a study by Debourgh, (1999), the increasing demand and growing consumer experience with flexible education programmes that is aimed at supporting career development and lifelong learning have increased the expectations of people (students and parents) for quality instruction among other things and satisfaction for learning.

Satisfaction in any educational institution has been asserted to be from the level of pleasure and effective method of teaching and learning that students experience (Wang, 2003). Thus, the service quality provided by the academic institution would determine the satisfaction that students received and their persistence in the distance education programme.

Bolliger (2004) indicates strong positive correlation between instructor performance and student satisfaction. This assertion is confirmed by Jung (2005) who intimates that the role of instructors in open learning environment is important for success of the students.

Sekye (2013) noted the importance of communication in the distance learning process. Communication such as those between learner and content, learner and instructor and learner and learner can enhance students learning experience and satisfaction as a result, its absence may create isolation for students (Mood, 1995). It is said that students in distance learning should be motivated, organized, and committed. They must take responsibility for their own learning (Belanger and Jordan, 2000). It has been reported by Card and Horton (2000) that students enjoy the convenience of distance learning especially, online courses, and they see this as more important than the face-to-face interaction with instructors and course mates. Further, support services rendered to students at the centres has been proven to be instrumental for distance learning students (Jung, 2005; Moore & Kearsley, 1996).

Satisfaction has been asserted by Kuo, Walker, Belland & Schroder (2013) as an important indicator of the quality of learning experiences. According to Sekye (2013), the success of distance education depends on supportive efforts shared by the distance education institution, government, and in some cases private organizations. He intimated that the institutions are required to ensure efficiency in access, student support services, quality control and other vital functions. The quality of these support services would determine the level of satisfaction that a student gets from the programme. It has been reported that though successful completion and improvement of students' education are the compelling reasons for the existence of tertiary institutions, administrators tend rather to focus disproportionately more time on programmes aimed at attracting and admitting students rather than ensuring their satisfaction. Thus, the drive for more numbers is pursued at the expense of quality of services provided (Gruber, Reppel & Voss, 2010).

Limited literature exists even in the developed countries on student satisfaction (Bolliger, 2004). This assertion can safely be extended to Africa and even Ghana. In Ghana majority of the studies consider quality of education or satisfaction of education in the traditional campuses (see Tsedzah & Obuobisa-Darko, 2015; Fosu & Poku, 2014). Most studies also, used simple descriptive statistics with very limited sample sizes which may not be representative enough. This study therefore, uses logistic regression to determine factors that influence student satisfaction in distance learning. It is worthwhile investigating student satisfaction in distance education in order to provide the needed services that result in the desired outcome for students and retention. Furthermore, knowledge of factors that satisfy students may also help school administrators to tailor their services towards meeting such needs in order to increase enrolment that will inure to increase in revenue.

The rest of the paper is structured is as follows: review of related theoretical and empirical literature, materials and methods, discussion and concluding comments.

Theoretical Underpinnings and Review of Extant Literature

Theoretically, distance education is defined as a learning environment in which 'students and teachers are separated by distance and sometimes by time' (Moore & Kearsley, 1996). Further, distance education is different from traditional education due to openness to adults who are gainfully employed, fully occupied with family life and does not depend on face-to-face meetings. It is characterized by mass-communication, student autonomy, individualization and independent of time, place and classes (Holmberg, 2008). The existence of this distance therefore implies students must be provided with the relevant teaching and learning experience that will academically integrate them into the learning environment. In line with this, Holmberg in 2008 prescribes a theory for teaching and learning in distance education that is highly encompassing. The theory considers empathy and personal relationship between the stakeholders (students, instructors, administrative staff and the institution) involved in the teaching-learning process as cardinal to distance education. It is believed that the empathy approach can lead to personal, friendly interaction between students, tutors and the supporting staff. This can make teaching in distance education conversation-like presentations of lessons. He asserts this will results in the feeling of a personal relation that may exist between the students and tutors, fostering well-developed self-instructional material and communication at a distance. In addition, it can result in intellectual pleasure and study motivation would lead to attainment of study goals and the use of proper study processes and methods.

Another theory is the stakeholder theory. Indeed, the competitive nature of higher education in Ghana requires universities to treat students as customers (Tsedzah & Obuobisa-Darko, 2015).

The stakeholder concept has been explained by Freeman (1984) as any person or group of persons whom a company impacts or is able to impact on the achievement of the company's objectives. According to Freeman & Mcvea (2001), stakeholder management suggests that managers must formulate and implement processes which satisfy all stakeholders in the business.

The overarching task in this process is to manage and integrate the relationships and interests of customers among others in a way that ensures the long-term success of the firm. A stakeholder approach emphasizes conscious management of the business environment, relationships and the promotion of shared interests. Evan & Freeman (1993) in developing a justification of a stakeholder approach argued that organizations are required to treat people "as ends unto themselves." This implies, managers should make corporate decisions by respecting stakeholders' well-being rather than treating them as means to a corporate end. Similarly in distance education, students as important stakeholders must be treated well if the educational institute is to achieve its core mandate.

Based on these two theories we developed the following hypothesis:

H_0: The student-instructor interaction in distance education does not lead to any desired outcome that can bring about satisfaction to students.

H_0: The Performance of the instructor in the delivery of prepared materials does not motivate students to attain desired study goals which will lead to their satisfaction.

H_0: If administrative support services are not friendly, but discriminatory and information provisions are unsatisfactory, students will not be satisfied with the education provided in the distance education programme.

H_0: The self-instructional materials and communications provided are not satisfactory to assist the students in their quest for knowledge in the chosen fields.

In reviewing empirical studies on satisfaction in distance education, we share the views of Yukselturk & Yildirim (2008) who define students' satisfaction as "learner-reported feelings about interaction with instructors and peers, course structure, institutional support, and flexibility". They assert that Swam, (2001) indicates that the use of communication tools (both charts and discussions) in interaction seems to be one of the most influential features of online courses. This claim is supported by Woods (2002) who suggests that both quality and frequency of interaction with the instructor and peers are much more important to the success of online courses and student satisfaction than that in traditional courses. Yukselturk & Yildirim (2008) in a mixed method approach using thirty respondents however report low level of interaction between learners. The result of the low social interaction during learning in online environment led to low levels of satisfaction. Furthermore, in using the Kano methodology which asserts that satisfaction is multidimensional to understand students' perspective of effective professors, Gruber & Voss (2010) identify five attributes as excitement factors. They include; fostering of team work, expertise in other subject areas, and variety of teaching methods, friendliness and humour. These factors they claim have the potential to satisfy students very much. The importance of these attributes gives support to previous findings of Faranda & Clarke in 2004 who posit that students value a "mixing up" of lectures that lighten up the presentation, interaction in class which allows them to know their peers and discussion of topics beyond course-related material. In studying 147 adults in distance learning through an online programme, it was posited that the learners in an online programme, easily lose motivation and feel less satisfaction if courses do not stimulate their active participation and interaction (Park & Choi, 2009). Thus motivation and satisfaction in distance education students may be anchored on motivation and interaction among learners and instructors. In a survey study involving 100 students in Chandigarh, India, Thapliyal (2014) claims Robinson (1995) argues that "the success of distance education programme depends on how well the course production, delivery and student support sub-systems function". The import of this statement therefore is distance education is expected to provide a 'balanced meal' to students if its full impact is to be achieved.

Thaplivaal (2014) posits assessment and evaluation in any educational programme is critical in measuring the quality of the programme. The study asserts fair and adequate assessment ensures that teachers give due recognition to the students efforts. This does not only promote the image of the institution, but motivates students to even do more since evaluations are made very objectively and they can easily analyze their performance on the basis of their internal assessment. The consequence of this fair assessment is students' satisfaction of the programme.

Inman et al. (1999), in a study indicates three things that students expect from an instructor in the distance learning programme that inures to their satisfaction. These are helpful instructional materials for interacting with the distance learning medium, some on-campus session and the availability of the instructor at the time when needed. In their

study Biner et al., (1994) report that students' satisfaction might also increase when supporting staff are attentive to their progress and challenges. Furthermore, factors that influence students' satisfaction include interaction with instructors, active discussion among learners and clarity of programme design and perceived learning (Swan, 2001). Besides, high quality instructional and other staff support services also result in higher student satisfaction with the educational environment (Yukselturk & Yildirim, 2008). This assertion by Yukselturk & Yildirim (2008) is a further confirmation of a previous study by Schwitzer et al., (2001) who intimate that interactive and effective student services are very important factors when one measures students' satisfaction. In a related study, Moore & Kearsley (2005) claim that students might interact with specialists in various forms of student support besides interacting with instructors who help students learn the course contents.

Roberts & Styron (2009) in a study on students' satisfaction and persistence using multivariate analysis of variance indicate in literature review that the most crucial aspect of a student's interaction and engagement with an institution of higher learning is the relationship with the course advisor. They posit that academic advising should be a process in which faculty and staff interacts with students as they progress, allowing and helping them to achieve their educational and career goals. Pascarella & Terenzini, (2005) contend academic advice undoubtedly would result in students' satisfaction since they take their relationships with their academic advisors very seriously. Williams, et al., (2008) posit "This relationship can improve the student matriculation processes and provides students with a sense of security. The relationship also provides a sense of connectedness where students feel that they belong to the school and that the school belongs to them". Miller (2005) argues that students can expect colleges to provide services that will help them succeed. In a related study, Roberts and Styron (2009) emphasis the need for higher educational institutions to provide and maintain various academic resources that promote students' success in distance education. Kuh et al. (2005) suggest responsive, learner-centered support services, such as peer tutoring and special labs for writing and mathematics. These centres provide academic support services that may be confronting students. Pascarella & Terenzini (2005), intimate that the provision of academic resources to support students has shown statistically significant positive impacts on student persistence and satisfaction.

Most of the higher institutions of learning aim at providing meaningful learning experiences for their students. This aim is a collective responsibility of faculty, staff and students. However, students also have their own expectations of learning experiences. These expectations may impact students' response to their academic surroundings and affect their decisions of whether or not to remain in certain fields of study, or college in general (Pike, 2006). The absence of meaningful learning experiences from the curriculum makes students often become disengaged and dissatisfied because they see no relevance in what they are learning. The implication of this is dissatisfaction and likely withdrawal.

In situations where students have few chances to participate in meaningful learning experiences, they are denied the opportunity to integrate and apply the knowledge they have acquired in their school (Kuh et al., 2005; Moxley et al, 2001).

In a study assessing students' satisfaction in a private university in Ghana, Tsedzah & Obuobisa-Darko (2015) intimates that academic support services provide satisfaction to students although the result was weak. They report that in a study by Wiers-Jessen, et al. (2002) the quality of university support facilities is very important in achieving student's satisfaction. Gruber & Voss (2010), reports attributes of faculty such as friendliness, approachability, enthusiasm, being receptive to suggestions and humor as having the highest impacts on students' satisfaction.

Conceptual Framework
According to Thomas & Galambos (2004), satisfaction of students is a complex construct and is influenced by various characteristics and institutions. Student satisfaction according to Wiers-Jenssen et al. (2002) is defined as the total response to the learning experience of a student and the assessment of the services provided by universities and colleges. In a related study, Elliot and Shin (2002) also define students' satisfaction as favorable subjective assessment of the various outcomes and experiences associated with education.

In a literature review, Tsedzah & Obuobisa-Darko (2015) posit that the concept of student satisfaction may be viewed as customer satisfaction due to the relationship that exists between the students and the institution of learning. Based on these assertions, empirical, theoretical and personal views we develop the construct to show how the student satisfaction relates to the independent variables.

Insert figure 1

Satisfaction in distance education for students is expected to meet most if not all of the expectations of students. While the expectations of the individuals may vary, flexibility and convenience in the programme, supporting staff's interest in students, interaction with the course instructor and feedback, the delivery of the course content and the quality of instructional materials and active discussion among students as well as other crucial factors may provide satisfaction (see Moore, 1989; Moore & Kearsley, 2005; Biner et al. 1994; Arbaugh, 2000; Maki et al. 2000). Furthermore, the following reports from participants also may indicate satisfaction of students in a distance education programme: Recommending the school to other people, taking future courses with the school, ability to apply lessons to solve problems and assessment procedures well communicated and results showing actual performance. From the aforementioned expectations, it can be deduced that administrative support services play a crucial role in the satisfaction of the students and may have positive impact. A very supportive staff may result in a satisfied student on a distance education programme (Tsedzah & Obuobisa-Darko, 2015). In the same vain, when students evaluate the course in general and rates it high, it may imply satisfaction on their part. Thus, students' satisfaction may be explained by course evaluation. Furthermore, it has been proven that faculty's performance can explain satisfaction of students (Williams, et al., 2008). The implication of this is that when the interaction with students and delivery of tutorials are apt, it may lead to a satisfied student body.

Materials and Methods

Study Area and Source of Data

The University of Education, Winneba (UEW) was established in September, 1992 as a University College under PNDC Law 322. The University College was upgraded to a full University status on 14th May, 2004. The Institute for Educational Development and Extension (IEDE) of the UEW, was established in 1996, to afford the continuing students and prospective applicants the opportunity to access university education conveniently at their doorsteps and at wieldy cost without forgoing quality. The IEDE is the extension wing of the UEW responsible for the distance education programmes of the University. It also has the mandate of providing opportunities for students and teachers to experience holistic and quality school based teaching experience as well as creating opportunities for continuing professional development of staff of UEW and professionals from other tertiary and non-tertiary institutions.

The IEDE of the UEW has over the years increased its distance learning education centers across the country to 37 as the end of 2016. The distance learning centers can be found in all the 10 regions of Ghana of which Volta Region is one. Volta Region has 5 study centers located in Ho the regional capital, Sogakope, Denu, Hohoe and Dambai. The study centers in the Volta Region have been identified as one of the fasters growing distance education study centers of UEW in Ghana over the past 3 years. The centers have a student population of 3092 who are offering various diplomas, degree and post graduate programmes.

Data Collection and Data Management

In order to meet the objectives of this study, a sample size of 309 respondents were chosen from a population of 3092 students of the IEDE of the UEW. Stratified random sampling technique was employed to select the respondents from the five study centers in the Volta Region. The sample size was selected based on Kothari (2004) recommendation for sample size which states that 10 to 20 percent of the accessible population is adequate enough for sample size. The study therefore, selected 10 percent of total population of students in each of the five study centers to sum up to 309 sample size. The students that took part in the study were chosen using simple random technique using the lottery method based on the list of students offering various courses in the five centers the Volta Region.

The institute runs business and education programmes in the Ho centre and only education programmes in Sogakope, Denu, Hohoe and Dambai centres. The education programmes include diploma, bachelor and post graduate diploma, whiles diploma and bachelor programmes are offered for the businesses.

Self-administered questionnaire were used in collecting data from the respondents in this study because this method on a large scale helps avoid as much as possible loss of questionnaires albeit its own weaknesses. Nevertheless, nine (9) questionnaires could not be accounted for during the process of administration. It has been observed that

respondents still were communicating with one another while responding to the questionnaire, a weakness we identified may influence results though adequate explanations were given to respondents.

Research Instrument and Variable Measurement
The structured questionnaire used for this study was adopted partially from the study of Ali and Ahmad (2011). It has a five point Likert-scale that ranges from 1 to 5; 1-Strongly disagree, 2-disagree, 3-not considered 4-agree, 5-strongly agree. The structured questionnaire is in two sections. The first section has the demographic data of the respondents: gender, age, marital and employment status while the second section has in total thirty four questions relating to distance education and satisfaction. The main questions were divided among four independent variables and one dependent variable. The independent variables with sub-components forming each construct include Administrative support services, Course Evaluation, Instructor's Performance and Student-Instructor Interaction, while the dependent variable is Students' Satisfaction. The sub-questions in each component of the independent variables seek to find out factors that indicate student's satisfaction in distance education programme.

To measure administrative support services, seven questions ranging from availability of staff to how students were treated in the support office were measured using the Likert scale. The sub components in this measurement are: Staff was always available to provide needed services; The staff answers all relevant questions I asked; Information from main campus is always made available to me any time I need it or on notice board   ; Results were duly pasted on notice board on time; When I had issue with my results staff quickly provided help; Overall staff is helpful in assisting me with issues and I always feel welcome to the office anytime I go there.

The course evaluation measurement which comprised of six sub constructs measured on the five Likert scale include: Overall, I have valuable learning experiences from my courses; The assignments were relevant and useful; Course materials were relevant and useful; Expectations were clearly stated either verbally or in the syllabus; The testing and evaluation procedures were fair; The workload was appropriate for the hours of credit.

In order to measure instructors' performance nine questions constitute this construct. They include: Overall these instructors were effective; the instructors stimulated students learning; the instructors treated all students fairly; the instructor treated all students with respect; the instructor welcomed and encouraged questions and comments; the instructor presented the information clearly; the instructor emphasized the major points and concepts; the instructor demonstrated knowledge of the subject.

Further, Student-Instructor Interaction was measured using five sub constructs which include; The instructors encouraged me to become actively involved in the course discussions; The instructors provided me feedback on my work through comments; I was able to interact with the instructors during the course discussions; The instructors treated me individually well and The instructors informed me about my progress periodically.

The dependent variable which is students' satisfaction was measured using seven sub constructs which include, The programme is convenient for me and I am able to combine it with my work and other responsibilities; I will recommend the school to my family, friends and other people; I will like to take future courses with the school; the quality of teaching and delivery is good and meet my expectation; the general attitude of office staff satisfy my expectations and l feel good at their treatment; The lessons thought me can be applied to solve problems and The assessment procedures are always communicated and results show my actual performance.

After coding and entering the responses into the Statistical Package for Social Sciences (SPSS), the five-point likert scale responses were transformed into two-point likert scale (Agree =1, Disagree=0). The data transformation was done using recoded into different variable function of SPSS.

Model Specification, Estimation and Tests

The dependent variable in logistic is usually dichotomous, that is, the dependent variable can take the value 1 with a probability of success p, or the value 0 with probability of failure, $(1-p).$ To explain the logistic regression, we show here the logistic function $f(z),$ which designates the mathematical form on which the logistic model is based

$$f(z) = \frac{1}{1+e^{-z}} \tag{1}$$

where z represents the values of the function, such that $-\infty \leq z \leq \infty$. The relationship between the predicator and response variables is not a linear function in logistic regression, instead, the logistic regression function is used, which is the logit transformation of p. To obtain the logistic model from the logistic function, we write z as the linear sum.

$$Z = \alpha + \sum_{i=1}^{k} \beta_i x_i \tag{2}$$

where x_i are explanatory variables of interest, $\propto$ and β_i are constant terms signifying unknown parameters and k is the last term. Combining (1) and (2) gives:

$$f(Z) = \frac{1}{1+e^{-(\alpha+\beta_1 x_{1,i}+\beta_2 x_{2,i}+\cdots+\beta_k x_{k,i})}} \tag{3}$$

For notational convenience, we will denote the probability statement as simply $p(X)$ where x is a notation for the collection of variables x_1 through x_k. Hence, the logic model may be written as

$$f(X) = \frac{1}{1+e^{-(\alpha+\beta_1 x_{1,i}+\beta_2 x_{2,i}+\cdots+\beta_k x_{k,i})}} \tag{4}$$

The logic model is then transformed into linear function using logit transformation as follows:

$$Logit(X) = In_e \left(\frac{P(X)}{1-P(X)} \right) \tag{5}$$

Where, $\quad P(X) = \frac{1}{1+e^{-(\alpha+\beta_1 x_{1,i}+\beta_2 x_{2,i}+\cdots+\beta_k x_i)}}$

The transformation allows us to compute a number, $logit\, p(X),$ for an individual with explanatory variable given by $X.$

$$Logit\, P(X) = \alpha + \beta_1 x_{1,i} + \beta_2 x_{2,i} + \cdots + \beta_k x_i \tag{6}$$

Hence, the logit of $P(X)$ simplifies to linear sum. The quantity $P(X)$ divided by $1 - P(X)$, whose log value gives the logit, describes the odds for student not been satisfied, with independent variables specified by $x.$

$$\frac{P(X)}{1-P(X)} = \text{Odds for individual } X$$

The aim of logistic regression is to correctly predict the category of outcomes for individual cases using the most parsimonious model. As a result, a model is formulated that contains all explanatory variables that are essential in predicting the response variable (Kleinbaum and Klein, 1994). For this study, distance education students' satisfaction are influenced by explanatory variables such as Administrative support services (ASS), Course Evaluation (CE), Instructor's Performance (IP) and Student-Instructor Interaction (SII). The logistic regression model is fitted to the data as follows:

$$Logit\,(P(y=1)) = \propto + \beta_1 ASS + \beta_2 CE + \beta_3 IP + \beta_4 SII + \varepsilon \tag{7}$$

Where p is the probability of students being satisfied in distance education, the $x's$ are explanatory variables of interest, $\propto$ and β_i are constant term and coefficients respectively signifying unknown parameters and ε being the residual term. The coefficients of the model predicators are tested through the following hypothesis:

$$H_0 : \beta_j = 0$$

$$H_i : \beta_j \neq 0 \quad j = 1,2,3,4$$

After fitting a logistic regression model to a given set of data, the adequacy of the model is scrutinised by overall goodness-of-fit test and examination of influential observations. One concludes a model fit if the difference between the observed and fitted values is small and if there is no orderly contribution of the difference to the error structure of the model. Hosmer-Lemeshow test is usually employed in accessing the fitness of logistic regression. Though, appropriate estimation methods which consider the sampling design in estimating logistic regression model parameters are present in various statistical packages, there is a corresponding absence of design-based goodness-of-fit testing procedures. As a result of this absence, it has been proposed that goodness-of-fit be examined by first fitting the design-based model, then estimating the probabilities, and subsequently using iid-based test for goodness-of-fit and applying any results to the design-based-model (Hosmer & Lemeshow, 2000). The hypothesis for model fitness can be measured by the Homer-Lemeshow test as follows:

H_0: The model fits the data

H_i: The model does not fit the data

Empirical Results

Table 1 presents demographic information of the distance education students that took part in the study. More than 50% of the students sampled were females (55.3%) and the rest (44.7%) were males. The results shows that majority of the respondents (39.7%) are in the age group of 26-30years, followed by the age group 31-35years (25.0%). The rest are in age groups of 20-25years and 36 years and above (21.3% and 14.0% respectively). This indicates that majority of the respondents are in the active age groups. Regarding the levels at which respondents are in the university, 45.0% are level 100 students, 23.3% at level 400, 22.3% are level 200 students and 9.3% at level 300 students. This shows that majority of the respondents constitute students who spend more than 1 year in the university and therefore, in position provide relevant answers to the questions. Majority of the respondents are single (63.7%) whiles the rest 36.7 are married. In relation to the employment status of respondents, 67.7% are employed and schooling as well. It is revealed that 32.3% of the respondents do not have any form of employment.

Insert table 1

Logistic regression analysis of factors influencing student satisfaction

This section analyses the factors that influence students satisfaction in distance education from the data collected. This was done by examining the relationship between some variables by employing binary logistic regression analysis with the aid of SPSS. Students' satisfaction in distance education was regressed on factors predicting students' satisfaction in distance education. Students' satisfaction is a categorical variable. Hence, the ordinary regression approach is not suitable. Due to this, the study resort to binary regression technique. Student satisfaction is categorical since it comprises Yes/No (Agree/Disagree), thus, whether students were satisfied or not satisfied in distance education. As such, the response variable is appropriate for not just any logistic regression but a binary logistic regression. The results of student satisfaction in distance education, administrative support services, course evaluation, instructor's performance and student-instructor interaction are discussed below.

Insert table 2

Insert table 3

As shown in table 2, the Omnibus test of model coefficient gives us the overall indication of how well the model performs in predicting student satisfaction in distance education based on the availability of predictive variables. A

p-value of 0.000<0.05 indicates that the model is significant and can well forecast student satisfaction in distance education using the various explanatory variables included in the equation. This is supported by Nagelkerke R Square value of 0.646. This value indicates the amount of variability that is explained by the predicators. A value of 0.646 specifies that the predicators are able to explain approximately 65% of variability in student satisfaction in distance education. Additionally, the Hosmer & Lemeshow test for goodness-of-fit test of the model shows a p-value of 0.240 which is greater than 0.05. This indicates that the model is a good predictor of the dependent variable. The scores test indicates that all the explanatory variables included in the model would be significant (0.000<0.05). Table 3, shows how well the model predicts the correct category (student satisfaction/no student satisfaction) for each case. Thus the model correctly classified 88.7% of cases overall, showing that the model correctly classified 88.7% of the students who are satisfied with distance education. The overall model evaluation and the goodness-of-fit tests revealed that the model is good in predicting satisfaction of students with UEW distance education programmes in Ghana. Thus, it can be concluded that the hypothesized model fits the data well.

The calculation of the crude odds ratio of student satisfaction factors, x, is given by the estimates $Exp(\beta)$. The odds ratio of student satisfaction factors ascertains the influence it has on satisfaction of students in distance education. The wald's and log likelihood ratio test were also performed to examine the significant effect of the factors influencing student satisfaction in distance education. A probability value of 0.000<0.05 was considered to be statistically significant. Therefore, the insertion of that factor determining student satisfaction is pertinent in ascertaining student satisfaction in distance education $Y = 0\ or\ 1$

The maximum likelihood approach was employed in estimating the model parameters. The estimates for each explanatory variable are interpreted relative to the reference category. As presented in table 2, availability of administrative support services at the study centre for distance education students is 13.013 more likely to influence student satisfaction compared to non-availability of administrative support services at the study centre with 95% confidence interval (p-value =0.000) is statistically significant. The odds ratio of 5.883 and confidence interval of 95% (p-value= 0.000) indicates that course evaluation by students which they rate high are likely to give them satisfaction than a low rated course. In relation to instructor's performance and student satisfaction, the study findings revealed that faculty's performance has statistically significant influence on student satisfaction with odds ratio of 4.157. Thus, instructors seen to be performing well in facilitation of courses are likely to influence student satisfaction than those considered not to be performing well on the job. Student-instructor interaction is statistically significant (p-value= 0.000) at 95% confidence interval. When the interaction between students and lectures during delivery of tutorials is considered by students to be apt it is likely to influence satisfaction of students in distance education compared to where there is no proper interaction between lecturers and students.

The logistic regression can be written as: (see table 2)

$$Logit\ (P(y=1)) = -1.968 + 2.566ASS + 1.772CE + 1.425IP + 1.034SII \qquad (8)$$

Discussion
The purpose of the researchers in this paper is to identify factors influencing students' satisfaction in distance education programmes in UEW. Literature in distance education even in the developed countries on student satisfaction (Bolliger, 2004) is limited. This assertion can safely be extended to Africa and even Ghana. In Ghana majority of the studies consider quality of education or satisfaction of education in the traditional campuses (see Tsedzah & Obuobisa-Darko, 2015; Fosu & Poku 2014). In addition, most studies used simple descriptive statistics with very limited sample sizes which may not be representative enough. This study therefore, fills the gap in literature on satisfaction in distance education by using logistic regression involving large sample categorical data. Students' satisfaction in distance education is expected to meet most if not all of the expectations of students. While the expectations of the individual may vary, flexibility and convenience in the programme, supporting staff's interest in students, interaction with the course instructor and feedback, the delivery of the course content and the quality of instructional materials and active discussion among students as well as other crucial factors may provide satisfaction (Moore & Kearsley, 2005).

The study found that all factors predicting student satisfaction in distance education were significantly contributing to student satisfaction in Institute of Extension and Distance Education of University of Education in Ghana. The study found that provision of administrative support services at the distance education for students influence their

satisfaction in the distance education programmes. The study confirmed that making information from the main campus of the University always available to students have positive effect on their satisfaction in the distance education programme. Besides, pasting of results on notice board on time, assistance of staff with issues concerning students, good customer service enjoyed in the office and answering all relevant questions translated into student satisfaction in distance education. This is in line with the findings of Tsedzah & Obuobisa-dark, (2015).

With regard to course evaluation, the study found that student satisfaction in distance education is influenced by students' assessment of the courses run in the university. The relevance and usefulness of course materials, structure of the syllabus, the fairness of testing and evaluation procedures of students and the appropriateness of workload for hours of credit contributed to student satisfaction in distance education programmes.

Relationship between instructor's performance and student satisfaction has been found to be significantly positive. In measuring the instructor's performance, overall effectiveness of instructor, the ability of the instructor to stimulate students learning, clear presentation of information clearly by the instructor during lectures and the demonstration of knowledge of the subject determines instructors' performance which have influence on satisfaction of students with distance education programmes in IEDE of UEW. This finding supports the assertion of Yukselturk & Yildirim (2008) who intimate that high quality instructional and other staff support services also result in higher student satisfaction with the educational environment.

Finally, association between student-instructor interaction and student satisfaction in distance education revealed significant positive relationship. It was found that encouragement of students to participate actively in the course discussion by instructors, instructor providing feedback on students work through comments, students being able to interact with instructors during course discussions and informing students about their progress periodically as metric for student-instructor interaction positively influence students' satisfaction. No doubt Thaplivaal (2014) posits assessment and evaluation in any educational programme is critical in measuring the quality of the programme. The study asserts fair and adequate assessment ensures that teachers give due recognition to the students efforts. This does not only promote the image of the institution, but motivates students to even do more since evaluations are made very objectively and they can easily analyze their performance on the basis of their internal assessment, the result is student satisfaction in the programme.

Concluding comments

In this paper, we demonstrated that student satisfaction in distance education programmes are significantly influenced by administrative support services, course evaluation, instructors' performance and student-instructor interaction. The study recommends that provision of administrative support services should be improved upon through creation of spacious and well equipped office. Besides, adequate staff should be employed to man the various offices to promote efficient delivery of services to students. Qualified and experienced facilitators should be recruited to handle courses in the various centres. The university should put in more effort in the development of course materials for distance programmes and make it more user friendly for the students. Facilitators should be trained periodically and encouraged to continually relate with students in a cordial and professional manner, response to needs promptly and constantly encourage in issues relating to their education. When all this are done, students will be adequately satisfied with distance education programmes thereby, increasing student population and persistence in distance education programmes in Ghana.

Disclosure statement
No conflict of interest was reported by the researchers

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ONLINE OPINION MINING SYSTEM TO PREDICT THE QUALITY OF STATE UNIFORM SYSTEM OF SCHOOL EDUCATION

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ABSTRACT
The children of today will gear up to become the adult citizens of our country tomorrow. The growth and future of our country highly depends upon the quality of the present school education system. The school education system must focus on the development of mental aspects, social aspects, physical aspects, and overall aspects as they step into their adulthood. This paper analyzes the public opinion on *samacheer kalvi* (Uniform System of School Education) to predict the strength and weakness of our state school education system. The proposed work evaluates the quality of the system USSE (Uniform System of School Education) using a novel NLP-based rules for the tasks of subjective and opinion categorization at the feature level. To synthesize the quality of the proposed work various quality parameters involved and its opinions have gathered from faculties of higher education department, school education department, students from different streams and the public through an online system. Results show that the proposed algorithm able to perform better than Liu's model in *samacheer kalvi* domain, improving both accuracy and recall for the task of subjective and opinion categorization. The experimental results prove that a redesign in the syllabus of Tamil Nadu USSE is highly recommended.
Keywords: Opinion Mining, Sentiment Analysis, Samacheer Kalvi, Uniform School Education System.

INTRODUCTION
The Tamil Nadu Government headed by the chief minister K.Karunanithi took initiative in the year 2010 to provide common school education to all the children of our state by integrating various school education systems. The system was named as *samacheer kalvi* in mother (Tamil) language. Regarding the amendment of the system, a committee was formed by the government to frame the new curriculum and syllabus for providing the Uniform System of School Education in our state, Tamil Nadu. The various subject's experts from the state board and metric board were involved in framing the course material and syllabus for the students. The committee recommended the system called s*amacheer kalvi* with the following merits:

- The syllabus was designed as per National Curriculum Framework 2005 and matches the standards of NCERT books
- The system provided quality education to all children without any inequity based on their economy, community or educational background
- Child Centered
- The merits of other boards namely CBSE and Metrics are adopted into *samacheer kalvi* to diminish the variation among the students.

The system was implemented by the school education department of Tamil Nadu under the Act 2010 Uniform System of School Education for I-VI classes for the academic year 2010 and subsequently, in 2011 the system was extended up to 10th standard. The new system called s*amacheer kalvi* integrates the various stream of school education. There are over 12 million children studying in different categories of school boards which include:

- 45,000 State Board Schools
- 11,000 Matriculation Schools
- 25 Oriental Schools and
- 50 Anglo-Indian Schools

The common syllabus, textbook and scheme of examinations are regularized for USSE by the school education department when the system was implemented in TN. The aim of new system is diminishing the variations

between the Matriculation, CBSE and the Government school students. The motivation for a USES was obtained from the Ex. Chief Minister of Tamil Nadu, K. Kamaraj who was the first to initiate a common dress code in schools to diminish the differences among the students.

The state government headed by the chief minister of Tamil Nadu K. Karunanidhi ruled out in the public election conducted in the year 2011. After the change of Government, *Selvi* J. Jayalalitha, the chief minister of TN has dropped *samacheer kalvi* for the academic year 2011-2012 due to some political issues. Again, a new committee was formed by the ADMK (*All India Anna Dravida Munnetra Kalakam*) government in 2011, headed by the Chief Secretary, Debendranath Sarangi. The committee identified the following defects in the s*amacheer kalvi* syllabus and they decided not to recommend the system to the government. The demerits of the system identified include:

- The standard of Text Book is low.
- The recommendation of National Curriculum and Framework (NCF) and NCERT was not followed while preparing the syllabus and text book.
- No scope for children in rural and urban areas
- Joy of learning is poor
- The syllabus was overburdening the children
- No life skills/Survey Skills
- Analytical thinking is poor
- Poor Age appropriate learning
- The *samacheer* syllabus did not encourage thinking process of students
- No standard was adopted since the syllabus has been framed in a hurry
- The teachers were not trained to teach *samacheer* syllabus

Regarding this controversies, the former government appealed in the high court of TN, the court ordered the state to proclaim the system into immediate effect. The state government appealed to Supreme Court to stay the order of high court but the apex court refused the petition and insisted state Government to distribute the s*amacheer kalvi* books to students on or before 02/08/2011 (Thomas & Liffy, 2010). After the thorough investigation, the honorable court dismissed the state government petition on 09/08/2011 to drop USES in TN and directed the state government to implement the system on or before 19/08/2011(The Hindu, 2011). Though the honorable Supreme Court view is clear in its judgment, the dispute between two governments made public more confused about their children school education. This contradictory view on Uniform System of School Education motivates this study. In the proposed work, opinions are gathered from faculties in higher education department, school education department, students from various colleges and publics across the state to know the real scenario of the system.

CHALLENGES OF STATE (TAMILNADU) SCHOOL EDUCATION SYSTEM

In this universal educational system era, school education has become more confused due to different board of school education system in our country. As the world is becoming more and more spirited, it is essential for each one to manage with it to endure. On one hand, to stay alive in such a spirited competitive world, it is essential to have a complete thought about competitors' position in the education sector**.** The main challenge for state education is that the government of India is not preparing a common question paper for conducting NEET (National Entrance Exam Test) exam for MBBS (Bachelor of Medicine and Bachelor of Surgery) admission. Since each state in India follows their own curriculum and syllabus pattern of school education system, to gain sustainable competitiveness is unbalanced and confused educational surroundings, school education requires adapting to their settings and mounting cleverness that assists government to make a vital constructive judgment to strengthen the common syllabus pattern of the school education.

PROBLEM DEFINITION

The government of India is conducting NEET exam to select the candidates for MBBS admission. The NEET conducted by the central government of India is based on CBSE (Central Board of School Education) syllabus pattern. But, in our state (Tamil Nadu) only a few schools are following CBSE syllabus pattern. The peoples from rural areas are totally ignored due to the admission cost of the CBSE. It is most horrible to report that the students who are economically poor could not get admission in CBSE, India, though the students are talented. Due to this Non-uniformity, the students from our state could not score more marks in the examination conducted by NEET for MBBS admission, 2017. So it is highly important to examine the quality of state board syllabus whether it meets CBSE standard or not. Though the system provided uniformity in s*amacheer kalvi*, the standard is, way below the rest of the country's education policies. Also, in this modern world, it is essential to strengthen the syllabus pattern of school education to equip it to international standards for the entire nation, India. The proposed works addresses these problems.

RELATED WORK
Board of School Education System
Our system is intended to help the government to understand the overall appreciation of web users by easily finding and extracting relevant subjective information available from the web. To strengthen the proposed work, opinions have been gathered from teaching professional, public and students from the different educational stream. The various merits and demerits related to common education systems and opinion mining techniques have been discussed in this survey.

C.Mahalingam (2010), proposed a comparative statement of STATE BOARD, CBSE, MATRIC for mathematics and physics syllabus of 10th standard. He reported that TN launched the *samacheer kalvi* to replace Matric, Anglo Indian and Oriental Boards for standard 1-6. However, there were several viewpoints across teachers, writers, and the public that the new scheme is not of good quality as compared to global standards. To find the actual scenario, a comparison study of CBSE, Matric, and State board has been done for the core subjects such as physics and mathematics to look at the differences of the course content among the three boards. It has been found that our tenth standard syllabus was too high for the age group compared to the CBSE syllabus. Some points of the study brought out include:

- Tamil Nadu syllabus brings the best of the four syllabus
- This is just right for the age group of the students
- Candidates across the state will study the same syllabus
- It encourages students to focus on sports, literary and arts related skills
- It's on par with global standards

According to his analysis the above study witnessed that the state board syllabus had all qualities equal to Metric and CBSE systems.

R.Srinivasan (2012) proposed an article stating that transforming school education through a single board for the 10th class and the University exam for the 12th class, will facilitate a serious and comprehensive reform starting from clearly stating the objectives of school education, to curriculum design, instituting infrastructural facilities, ensuring teacher quality and redefining process of learning and evaluation that tests the learning outcome in the broader framework of public education that is contextualized and forms the basis for life-long learning process.
A workshop on 'Language and Education' in madhyapradesh (2011) recognized the grave danger which our entire mother tongue in India are facing today. The language is most important mode of communication which helps to express our thoughts, cultural history and knowledge deliberately. Therefore, it is necessary to protect and develop the different language skills of Indian people. Multilinguality is a new way of education. It refers to "first-language-first" education that is schooling which begins in mother tongue and transitions to another additional language.

A. Sadagopal and G. Haragopal (2009) have appealed to the Government by stating the need in change of education system through "All India Forum for Right to Education". They have been urging the government to replace the framework with the 'Common School System based on Neighborhood Schools' in consonance with the basic spirit and to providing a Fundamental Right to free and compulsory education of equitable quality to all children until the age of eighteen years. The suggestions recommended in the conference include:

- Incorporating a constitutional guarantee for providing adequate funding for the entire school system
- Include a provision to completely ban all forms of privatization and commercialization of education
- Hold public hearings in all district headquarters of the country in a democratic and transparent manner in the process of drafting a new Bill. But, the state government rejected the recommendation forwarded by the conference committee.

P.B Suresh Babu (2013) advocate, Chennai high court proposed an article and interesting findings were observed. He reported that there was creation of an inclusive free-school system in the United States, though schooling was not compulsory, not free of charge-British colonies. Blacks and Indians, in general, received no formal schooling in these institutions. The funded schooling and charity schooling is the base of monitorial school model. They provided totally free schools through property taxes. The political party called the Whig Party's role is to construct institution building, economic development, and free public schools. The schools for racial minorities across the nation generally had poorer resources. The common school system therefore by its evolution would mean a system of education run by the state with the common syllabus, free of cost, and uniformity in the standard for people of all classes, race, and religion in a country within the neighborhood of the child.

The common school ideas of the system were:

- Publicly funded schools open to all children irrespective of caste, creed, community, religion, economic condition or social status
- Where access to good education will depend not on wealth or class
- Adequate standards in all schools and at least a reasonable proportion of quality institutions
- No tuition fee is charged
- It meets the expectations of average parents so that they would not ordinarily feel the need to send their children to fee-charging schools outside the system.

The above survey reports witnessed the importance of common education system in Tamil Nadu, India. Though we have uniformity in our school system, the coaching and training provided to the government school student is poor. So, the standardization has to be achieved to make the students to score more marks in the competitive exam conducted by the state and central government of India.

Opinion Mining and Sentiment Analysis
The knowledge discovery algorithm in combination with Natural Language Processing is helpful for a knowledge worker to extract interesting findings from the web. Liu (2007) classified opinion system into two types; one is aspect based and another one non-aspect based scheme. The first approach is useful to analyze the text into knowledge that can be used for the decision making process. There are many approaches proposed by different authors, like (Archak, Ghose, & Ipeirotis, 2007; Decker & Trusov, 2010; Ku, Liang, & Chen, 2006; Pang and Lee (2004); Qiu, Liu, Bu and Chen, (2010); Lu, Zhai, & Sundaresan, 2009; Popescu & Etzioni, 2005; Titov & McDonald, 2008; Zhao & Li, 2009; Zhuang et al., 2006). Though we have referred many different approaches and methods for aspect based opinion mining, the proposed approach is most deterministic for feature based mining system.

In our work, we have framed a novel mining system which can be applied over multiple domains. Other similar techniques by Kim, Ganesan, Sondhi, and Zhai (2011); Jo and Oh, (2011), Pang and Lee (2008); and Marrese-Taylor, Rodriguez, Velasquez, Ghosh, and Banerjee (2013); Jin Hay and Srihari (2009) Xu, Cheng, Tan, Liu, & Shen, (2013), are based on Latent Dirichlet Allocation (LDA), which is similar to the article by Titov & McDonald, (2008). These approaches are based on document modeling by merging more topics into a single model. Further similar articles proposed by Duerias-Fenandez, Velsquez, and L.Huillier (2014) used unique methods to discover hidden pattern from web. The article published by Cruz et al., 2013, had a different views and perspectives that concentrated on domain analysis for discovering patterns.

The concept level sentiment analysis approaches focus on a semantic analysis of text through the use of semantic networks or web ontologies. These approaches allow the aggregation of conceptual and affective information associated with natural language opinions sentences (Cambria, 2013; Havasi, Cambria, Schuller, Liu, & Wang, 2013a, Havasi, Cambria, Schuller, Liu, & Wang, 2013b). The use of ontology technique to represent semantics associated with natural language text is much better than bags-of-words concepts. The recent approaches of this kind mainly leverage on existing affective knowledge. This helps understanding the semantics behind bag-of-concepts, such as WordNet. Indeed, (Cambria, Poria, Gelbukh, & Kwok, 2014) presents an API for ontology based sentiment analysis. This approach provides semantics and sentics associated with 15,000 natural language concepts. The ontology based approach also includes complex tasks such as domain adaptation; multi model analysis and opinion classification based on linguistic, audio, and visual features.

In this context, the proposed work is based only on linguistic features. Our approach does not use any external source of knowledge. The entire above mentioned article implemented various techniques to analyze different issues in opinion mining. The proposed work concentrates only on the state education system; to solve a very specific issue. The proposed technique is different from all the above approaches since it is aspect based and analyzes opinions at the sentence level. However, the method is not proposed as an application but rather as a service. To the best of our knowledge, this is the new work carried out for predicting the strength and weakness of the s*amacheer kalvi,* a uniform system of school education in Tamil Nadu, India.

MATERIALS AND METHODS
The novel linguistic algorithms have been proposed to extract subjective information and detect relevant polarity value of all the aspect identified in this domain. Based on the sentiment score, a summary is generated, from which the strength and weakness of state board syllabus pattern is evaluated at aspect level. In extension to this analysis, opinion mining systems have been constructed to strengthen the proposed work by collecting opinions

from teaching professional's, students and public. We use 'R' tool to analyze the user opinions for finding the real scenario of the s*amacheer kalvi* through various parameters level.

OPINION MINING IN WEB

The proposed work is to mine s*amacheer kalvi* reviews from the web to assist the government to assess the quality of school education system at various aspect levels. Determining the relative quality is one of the main benefits in our system. The top six aspects are identified based on the merit of relative importance, from user expressed review sentences. The idea of this work is to apply Liu ideas in order to perform aspect based sentiment analysis for the s*amacheer kalvi* domain. The existing author had this kind of analysis for electronic product reviews where people have expressed their opinions directly on any one feature. So, we develop a model for aspect-based opinion mining that especially considers features of the uniform system of school education domain. To extract the implicit features a well know method Lancaster in Lancaster (1966) have been reused. Our extension, based on the work of Marrese-Taylor, Velasquez, Bravo-Marquez, and Matsuo (2013), takes Liu's methods as a basis. The proposed novel approach has been applied into the s*amacheer kalvi* domain.

ASPECTS SENTENCE EXTRACTION

As Liu said in his work, the aspects are not directly appearing in text but they exist with some manner of feature expressions. The existing model is unclear how aspects that appear more than once in a document are managed. The process of extracting relevant expression is a complex task than finding the specific aspect, since the review expression in the document is large. The proposed system related to children school education system is having several review expressions than the product review sentences. The another issue found in Bing model is resolved by the new method that is define a sentence as an ordered set of tokens, including words and punctuation. The aspect that appears in three different places must be counted thrice. The word distance between two elements of sentence S can be calculated based on the difference of the positions of the two tokens in sentence S.

$$WD\,(t_a, t_b) = |position\ t_a - position\ t_b|\ t_a,\ t_b \in S \tag{1}$$

The minimal distance between 2 elements in S is 1. The maximum distance corresponds to $|S| + 1$. Another main task in this work is to find opinion orientation at feature level, the Bing idea in Hu and Liu (2004b) is used to extract important or frequent features.

FINDING OPINION ORIENTATION

The work set of heuristic rule from Ding et al. (2008) is used to predict the orientation of the opinion sentences. The approach is novel and it is used to calculate the optimistic and pessimistic words in each sentence and assign a sentiment score.

FINDING WORD ORIENTATION

The purpose of algorithm 1 is to find the relative orientation of each word in sentences. The step by step process explains the set of linguistic rules to perform the given task.

Algorithm 1 Word Orientation Rule

1. **If** word is in opinion_words then
2:     mark (word)
3:     orientation Apply Opinion Word Rule (marked_word)
4: **else**
5:   **if** word is in neutral_words then
6:     mark (word)
7:     orientation ← 0
8:   **end if**
9: **end if**
10: **if** word is near a too_word then
11:    orientation ← Apply Too Rules (orientation)
12: **end if**
13: **if** word is near a negation_word then
14:    orientation ← Apply Negation Rules (orientation)
15: **end if**
16: return orientation

Word rules: The score 1 is representing the optimistic orientation while -1 is often called as pessimistic orientation. The noun and adjectives in sentences with no opinion word may have an intrinsic score which is called as a neutral word.

Negation rules: There are rules applied to extract the right meaning of the expressions when negation word encountered in the sentences. They are, Negation Negative! Positive, Negation Positive! Negative and Negation Neutral! Negative. Negation words and phrases include: ''no'', ''not'', ''never'', ''n't'', ''dont'', ''cant'', ''didnt'', ''wouldnt'', ''havent'', ''shouldnt''.

FINDING FEATURE ORIENTATION
The algorithm 2 explains how to combine the orientation of all sentences to calculate the total score on particular aspects. The below algorithm describes the process in step by step manner.

Algorithm 2 Opinion orientation

1: **if** but_word is in sentence **then**
2:     orientation Opinion Orientation (aspect, marked_words, but_clause)
3:     **if** orientation – 0 **then**
4:       **return** orientation
5:     **else**
6: orientation ← Opinion Orientation (aspect, marked_words, not but_clause)
7:       **if** orientation # 0 **then**
8:         **return** -1 * orientation
9:       **else**
10:        **return** 0
11:     **end if**
12:   **end if**
13: **else**
14:   **for all** aspect_position in aspect **do**
15:     **for all** aspect_word in aspect_position **do**
16:       **for all** word in marked_words **do**
17:         sub orientation += Word Orientation (word) / WD (aspect_word.word)
18:       **end for**
19:       orientation += suborientation
20:     **end for**
21:     final_orientation += orientation
22:   **end for**
23:   **if** final_orientation > 0 **then**
24:       **return** 1
25:   **else**
26:     **if** final_orientation < 0 **then**
27:         **return** - 1
28:     **else**
29:         **return** 0
30:     **end if**
31:   **end if**
32:   **end if**

Feature summarization rule: Let S be a sentence that grasps the group of feature expressions $A= \{a_1.....a_m\}$, each one of them emerging only one time in S. Also, let AW_i be the collection of words that include feature a_i, where $AW_i = \{aw_{i1}, awi_2, . . .aw_{in}\}$. Each aw_{ij} will be called aspect word and it will correspond to an aspect expression a_i. If scores for each opinion word and neutral word in s are known, score for each aw_{ij} in s is given by the following aggregation function:

$$Score\ (aw_{ij},\ s) = \sum_{aw_j \in s} \frac{score(ow_j)}{WD(ow_j,aw_{ij})} \qquad (2)$$

Where ow_j is an sentiment expression or neutral expression in s, WD (ow_j, aw_{ij}) is the expression distance between the feature word aw_{ij} and the sentiment expression ow_j in s. Line 17 implements this formula in Algorithm 2. And, it is observed that in *samacheer kalvi* reviews some feature expressions are in fact composed by more than one word. For example, in the sentence ''*samacheer kalvi* has uniformity but standard is low '' an aspect expression that should be extracted by Liu's algorithms is standard low. Bing idea is failed to determine more aspects in the same sentences. So, the formula should not be used for each aspect expression. In the proposed work a rule is applied to each word in each expression.

Aspect aggregation rule: For each compound feature expression a_i in s, its orientation will be computed in view of the scores of all the words that create it, $aw_{ij} \in aw_i$, according to the following equation, which is applied in line 19 of Algorithm 2.

$$Score\ (ai, s) = \sum_{aw_{ij} \in AW_i} score\ (aw_{ij}, s) \tag{3}$$

Position aggregation rule: We have also seen that in *samacheer kalvi* reviews aspect expressions could appear more than once in a sentence. Assuming that ai emerges t times in s and eloquent the score of each aspect phrases emergence a_i^k, k {1, 2 . . . , t}, we propose that the final score of ai, or fscore (ai, s), should be computed by just adding the values of the scores of all the ai appearances in s, according to the following equation.

$$fscore\ (ai, s) = \sum_{k=1}^{t} score(a_i^k, s) \tag{4}$$

The formula appears in line 21 of Algorithm 2. Note that when a_i only appears one time in s; fscore (ai, s) = score (ai, s). Finally, lines 23–31 show how the orientation is calculated according to the fscore of each aspect expression. If fscore (ai, s) is optimistic, the sentiment is considered optimistic on ai (lines 23 and 24) and if it is pessimistic, the sentiment is considered pessimistic on ai (lines 26 and 27). If none of these cases occur, the sentence is considered neutral (line 29).

SUMMARIZATION

According to Liu's methodologies, aspects are ranked based on the occurrences of aspects but, in the proposed work the task is carried out based on the sentiment score calculated by the algorithm 2. The sentiment analysis technique is most helpful in this domain to predict the polarity value of system meanwhile the requirement of the number of occurrences is not needed. Let P_i and N_i be the number of positive and negative opinions on feature ai, $i \in \{1. . . n\}$. Then, $PScore_i$ and $NScore_i$ will be the min-max normalizes values of P_i and N_i, correspondingly. With this, we calculate the standard deviation of these scores using:

$$AVscore_i = \frac{PScore_i + NScore_i}{2} \tag{5}$$

$$STDScore_i = \sqrt{\frac{(PScore_i - AvScore_i)^2 + (NScore_i - AvScore_i)^2}{2}} \tag{6}$$

We distinguish our novel rule for each feature expression a_i, called relative importance, as the minimum-maximum normalized value of its $STDScore_i$. We recommend that feature-based synopsis should include visualization tool that shows the actual values of $PScore_i$; $NScore_i$ and relative importance for each feature expression.

ONLINE OPINION MINING SYSTEM

The online opinion mining system is designed to assess the quality of *samacheerkavi* school education system. Due to limited availability of public opinion in the web, online system has been designed to gather opinion from a different board of school teachers to evaluate the quality of the system performance. Moreover, reviews were also collected from medical college professor's to ensure whether the state education system is meeting the standards of NEET exam conducted by the central board of school education(CBSE), Government of India. The faculty views from higher education department, school education department, student, and public opinions have been taken into consideration to ensure the real scenario of the *samacheerkavi* system.
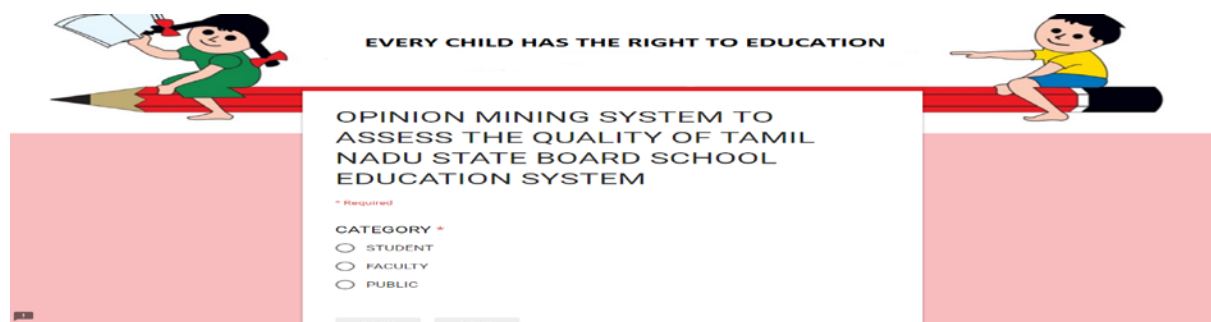

Figure 1 Online Opinion Mining System

Figure 1 represents the online opinion mining system involved collecting user opinion from various disciplines to assess a quality of the proposed system. There are three categories in which users are allowed to log in and submit their reviews. For each question, users must choose one option to complete the survey. The users are also permitted to express their own views in the text box available in the opinion mining system. To ensure the quality of reviews users have strictly adhered to login into the system through their personal Gmail account. There are some compulsory fields in which user detail must be given to proceed evaluating the online survey. The details for students category are student name, gender, and board of the school; faculty name, field (college or school), gender, designation, institution name, place of living (urban or rural) in faculty category, and name, gender, occupation for the public category are mandatory. The message "successfully submitted" is displayed when the user has answered all the questions in the template.

The total number of students participated in the system are 524, out of which 448 students were from the state board and 76 were students from CBSE. The total faculty strength is 156 among which 116 faculties were from higher education department and 40 faculties were from the school education department have participated in the system. As far as public category is concerned the total strength participated in the online opinion mining system is small that is70, out of which 41 are male and 29 are female. Totally, 750 reviews were gathered from a different stream of people to predict the quality of common school education system of TN.

CATEGORY	NAME	GENDER	EMAIL ID	BOARD	Qns 1 Does the syst	Qns 2 Does it impro	Qns 3 Is the system	Qns 4 Does it help	Qns 5 Does the syst	Qns 6 Does the syst	Qns 7 Do students	Qns 8 Does the syst	Qns 9 Does it provi	Qns 10 Is the studen
STUDENT	Kanjana	FEMALE	kanjana.s.2014.it@rajalakshmi.edu.in	STATE BOARD	Negative	Neutral	Neutral	Neutral	Negative	Positive	Negative	Negative	Neutral	Negative
STUDENT	Sriram A	MALE	srirukesh31@gmail.com	STATE BOARD	Negative	Negative	Neutral	Negative	Negative	Negative	Neutral	Neutral	Positive	Negative
STUDENT	Rangarajan R S	MALE	rangarajan1997@gmail.com	CBSE	Negative	Negative	Positive	Negative	Negative	Positive	Negative	Positive	Positive	Negative
STUDENT	Santhanalakshmi S	FEMALE	santhanalakshmi.s.2014.it@rajalakshmi.edu.in	STATE BOARD	Negative	Negative	Negative	Negative	Negative	Negative	Neutral	Negative	Positive	Negative
STUDENT	Sai prashanth.R	MALE	saiprashanth132@gmail.com	STATE BOARD	Positive	Positive	Neutral	Neutral	Negative	Negative	Negative	Neutral	Neutral	Negative
STUDENT	sivaranjani	FEMALE	sivaranjanisrikanth@gmail.com	STATE BOARD	Neutral	Neutral	Positive	Negative	Negative	Negative	Neutral	Negative	Neutral	Negative
STUDENT	RANGASHRI.V	FEMALE	rangashriv@gmail.com	STATE BOARD	Negative	Negative	Neutral	Negative	Positive	Negative	Negative	Negative	Positive	Negative
STUDENT	SINDHUJA M.	FEMALE	sindhumk30@gmail.com	STATE BOARD	Neutral	Negative	Neutral	Negative	Negative	Negative	Negative	Negative	Negative	Negative
STUDENT	SHIVA PRAKASH.S	MALE	s.shivaprakash29@gmail.com	STATE BOARD	Neutral	Negative	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral
STUDENT	SRIHARI V	MALE	venk.srihari@gmail.com	CBSE	Neutral	Positive	Negative	Positive	Neutral	Positive	Neutral	Positive	Positive	Neutral
STUDENT	SHRUTHI SUNDAR	FEMALE	shruthisundar.2014.it@rajalakshmi.edu.in	CBSE	Positive	Positive	Negative	Positive	Neutral	Neutral	Neutral	Positive	Positive	Positive
STUDENT	Smruthi P.V	FEMALE	smruthi997@gmail.com	STATE BOARD	Negative	Negative	Negative	Negative	Neutral	Negative	Neutral	Neutral	Negative	Negative
STUDENT	Ravi Subramanian N	MALE	ravisubramanian.n.2014.it@rajalakshmi.edu.in	STATE BOARD	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Positive	Neutral
STUDENT	Shivani.s.c.	FEMALE	Shivani.sc.2014.it@rajalakshmi.edu.in	STATE BOARD	Negative	Negative	Positive	Negative	Negative	Positive	Negative	Neutral	Negative	Negative
STUDENT	Shivani G	FEMALE	shivani.g.2014.it@rajalakshmi.edu.in	STATE BOARD	Negative	Negative	Positive	Negative	Negative	Neutral	Negative	Negative	Negative	Negative
STUDENT	srinivasan k	MALE	cheenuaus@gmail.com	STATE BOARD	Negative	Negative	Negative	Negative	Negative	Positive	Neutral	Positive	Neutral	Neutral
STUDENT	sreeharienee.p.r	FEMALE	sreeharienee@gmail.com	STATE BOARD	Negative	Negative	Negative	Negative	Neutral	Neutral	Positive	Negative	Negative	Negative
STUDENT	RAJNEEKANTHA.D	FEMALE	rajneekantharajneekantha@gmail.com	STATE BOARD	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative
STUDENT	SANKARAN R	MALE	sankaran.r.2014.it@rajalakshmi.edu.in	STATE BOARD	Neutral	Positive	Negative	Neutral	Positive	Positive	Positive	Positive	Positive	Neutral
STUDENT	NATHIYA R	FEMALE	nathiyarajum@gmail.com	STATE BOARD	Positive	Positive	Positive	Positive	Positive	Positive	Neutral	Positive	Positive	Neutral
STUDENT	mythly	FEMALE	mythly.14gmail.com	CBSE	Positive	Positive	Positive	Positive	Neutral	Positive	Positive	Positive	Neutral	Positive
STUDENT	PREETHI S	FEMALE	preethi.s.2014.it@rajalakshmi.edu.in	STATE BOARD	Positive	Negative	Positive	Negative	Negative	Negative	Negative	Negative	Positive	Neutral
STUDENT	A PREMALATHA	FEMALE	premalatha3096@gmail.com	STATE BOARD	Positive	Neutral	Negative	Negative	Neutral	Negative	Positive	Positive	Positive	Positive
STUDENT	B kiruthiga	FEMALE	kiruthiga1297@gmail.com	STATE BOARD	Positive	Neutral	Negative	Neutral	Negative	Negative	Positive	Positive	Neutral	Positive

Figure 2 Represents sample review template for online opinion system

The above snapshot in figure 2 represents the online opinion gathered from student's category. To assess the system, sentiment scores are computed by assigning the value 5 to Positive, 2.5 to Neutral and 1 to Negative polarities. The total review score for all questions is categorized into positive, negative and neutral. The sentiment score is calculated for each category of the user. The polarity value for student category are, 2453 positive score, 4397 negative score, and 2038 neutral score. The polarity values for faculty category contains 553 positive score, 1316 negative score, and 783 neutral score. For public category, the sentiment score for positive polarity is 377, negative polarity is 555, and the neutral polarity value is 258. The above results recommended the change in the existing scheme of the Tamil Nadu School Education System.

RESULTS & DISCUSSION

There was no specific website or common forum available for *samacheer kalvi* domain. So, the reviews are extracted from *twitter* and open web. The user reviews in web are limited due to lack of awareness of the system compared to product opinions available in the web. The figure 3 represents the reviews extracted from the web. The total reviews sets collected from web are 285 and total sentences are 1260. We use an algorithm from Kiss and Strunk (2006) to tokenize each review sentences.

Table 1 Data set

Corpus	*Samacheer Kalvi*
Reviews	285
Total sentences	1260
Opinion sentences	965
Percentage	77%

the syllabus must be enhanced with real world and current technologies..updates required

The standard of the book materials should be improved and everyone should get additional coaching classes for entrance exams

please do bring in a change in the education system where there is no discrimination in the syllabus such as cbse or state board let education be in a common form to all the willing minds to learn so that every

instead of theoretical learning please provide practical learning to students ,many students have many passions ,please try to identify their passion while teaching them and help them to become expert in their

i prefer cbse syallbus

Uniformity is compusorily but we need standard syllabus

An improvement in education system is must.It must teach life skills.It must enhance our capability. It must must not be mugup and vomiting.It must give practical knowledge to survive in this world.

the whole education system is wrong and nobody is getting benefited out of it.

Framing a syllabus and exam patterns that gives more importance to logical and analytical thinking rather than memorizing and vommitting would be good

Poor for competitive exam

there is a huge difference between CBSE and Stateboard students.

State board competitiveness is poor

make syllabus should equal to cbse syllabus

please change the syllabus to make advance,and try to compete with CBSE syllabus

No creativity in Stateboards

please change the syllabus to make advance atleast make it equal to CBSE syllabus

Hope,I have given opinion to best of my knowledge

Consider cbse syllabus for all over india

students should have to learn a lot and have more knowledge and get attention by their teachers as well as their parents.... This system should change their format.. Thank you

 does not provide much knowledge it only based on getting marks

samacheer kalvi system does not give knowledge its only focus on getting good marks. its doesnt even fullfil the current educational aspects

No analytical thinking in state board syllabus

Samacheer kalvi education does not give additional information and more knowledge when compared to others.so it needs more information and improve the system for better gaining of knowledge.

 educational system in tamilnadu is not good. it does not fullfil the knowledge aspect at all. it does not even the standard to follow as cbse have a better standard focus only on the students wellfare as state bo

always stateboard is the best of reading

Figure 3 Represents sample text reviews from online opinion system

Table 1 represents the data set details. The task of opinion identification has found 80 % of the average opinion sentences. The important fraction of the sentence which is identified can be used to validate the use of common school education system.

Table 2 Types of aspects in data set

Aspect Type	Total	Percentage
Explicit	890	92.22%
Implicit	75	7.8%
Total	965	100

Table 2 shows the manually extracted aspect expression; the representation of the explicit aspect extraction is 92.22 %. The below reviews are extracted from the web. They are, "scope of *samacheer kalvi is not bad"* the sentence directly expresses the positive feeling of the reviewer. Similarly, there are many aspects extracted and sentiment analysis is carried out to predict the polarity value for each aspect of the domain. There are reviews like "*State board syllabus is easy", "Analytical thinking is poor in state board*," *No child-centered studies in state board", "TN board syllabus is fair"* and   *"State board has uniformity"* etc. In this case, the term TN, State Board, *samacheer kalvi* and *samacheer* is taken as same meaning in order to group relevant domain sentences.The collection of above the specification is extracted and then evaluated to analyze the way in which the proposed opinion mining algorithm performs when applied to s*amacheer kalvi* domain. The rule from Hu and Liu (2004b) is used to extract aspect expression for performing sensitivity data analysis. The below tables 3 describes the precision and recall values for the different task carried out in our proposed work. The below result for the task feature extraction is not good in s*amacheer kalvi* domain since user reviews contain more complex sentences. But, the work for sentiment categorization has achieved better result. The significant observation in this experiment is that the precision and recall values will be decreased when all the feature expressions are considered for extraction. So, the precision and recall values for aspect extraction changes depending upon the feature set that is being selected.

PERFORMANCE EVALUATION

Table 3 represents the performance comparison between proposed algorithm and Bing Liu's methods. The precision value for the task subjective classification is improved with 18% and recall value is 21% increased over the baseline system. The task of opinion categorization is better here; the precision is 3% and the recall is 6%; comparatively increased over the Bing Liu's algorithm. The performance of the feature extraction is low compared to subjective and opinion categorization task in s*amacheer kalvi* domain because the public opinion contains a large sentence. Also, the task of aspect extraction becomes complex due to more compound sentences in user reviews.

Table 3 Performance comparison with other methods

Name of operation	Precision		Recall		F-Measure	
	Proposed	B.Liu	Proposed	B.Liu	Proposed	B.Liu
Explicit Aspect Extraction	92.22%	79%	70.6 %	67%	80%	73%
Subjectivity Classification	82%	64%	90%	69%	86 %	67%
Sentiment Classification	94%	91%	96%	90%	95 %	90%

The evaluation was made to know the actual performance of the task, feature extraction from the perspective of information retrieval and it calculates the precision at top n of the retrieved aspects, according to their relative importance.

Table 4 Aspect polarity score with relative importance

Aspects	Positive Score	Negative Score	Relative Importance
Uniformity	96%	4.0%	98%
Competitive Exam	10%	90%	92%
Analytical Thinking	20%	85%	90%
Scope	35%	55%	87%
Life skills/Survival Skills	25%	65%	78%
Communication skill	21%	68%	15%

The table 4 describes the score of each identified aspects which are extracted from web. According to these results, many aspects are negatively reviewed by the public user. The web users are given positive opinion at only one aspect which is called "Uniformity". The positive sentiment score for this aspect is 96%, negative score is 4.0% and its relative importance is 98%.
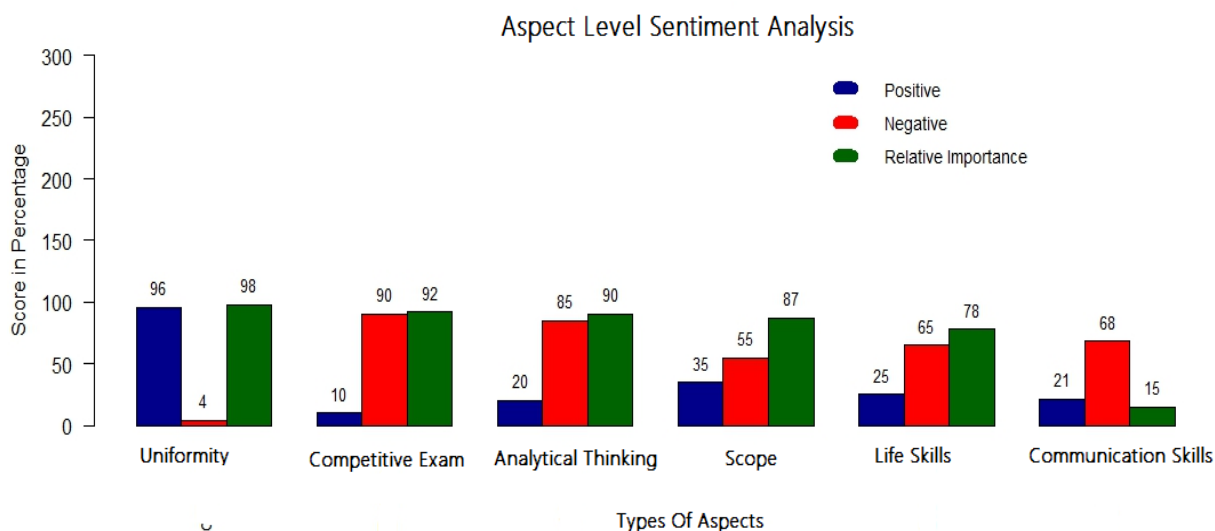
Figure 3 Represents result graph for aspect level sentiment analysis

Figure 3 represents the different types of aspect with their relative sentiment score. The figure 3 represent that people are not happy with s*amacheer kalvi* school system. The positive sentiment score for the aspect *competitive exam* is only 10% where as the negative score is 90%. Similarly, the aspects like *analytical thinking, scope, life skill and communication skills* are also poor. Though people are happy with the aspect *uniformity* the system has failed to prove the standardization at many different aspects of the system.

There was a huge support from the public for providing the common education to all children without any discrimination based on their economy, social or cultural background when the system was brought into use. From the above result it is clearly observed that still people need common education system with standardization of the syllabus pattern. The negative impact on many aspects made us to reinvestigate the real scenario of the scheme by constructing online opinion mining system.

Table 5 Polarity review score

Polarity Name/ Category of User	Positive	Neutral	Negative
Student	2473	2038	4397
Faculty	553	783	1316
Public	377	258	555

The above table 5 describes the categories of the user with their corresponding polarity sentiment score for all given questions in the template. The overall sentiment score for the polarity positive is 3403, 3079 is neutral and the negative score is 6268. The below figure 4 represents the overall sentiment score of the questions for each category of the user against polarity name. It is observed that the graph in figure 4 contains the highest polarity value for student's category than the categories faculty and public. The overall polarity value for negative sentiment is 6268 which is 54 % higher than the positive sentiment score and 49 % higher than the neutral sentiment score. Again, these scores are clearly indicating that the users are not happy with the current school education system in Tamil Nadu.
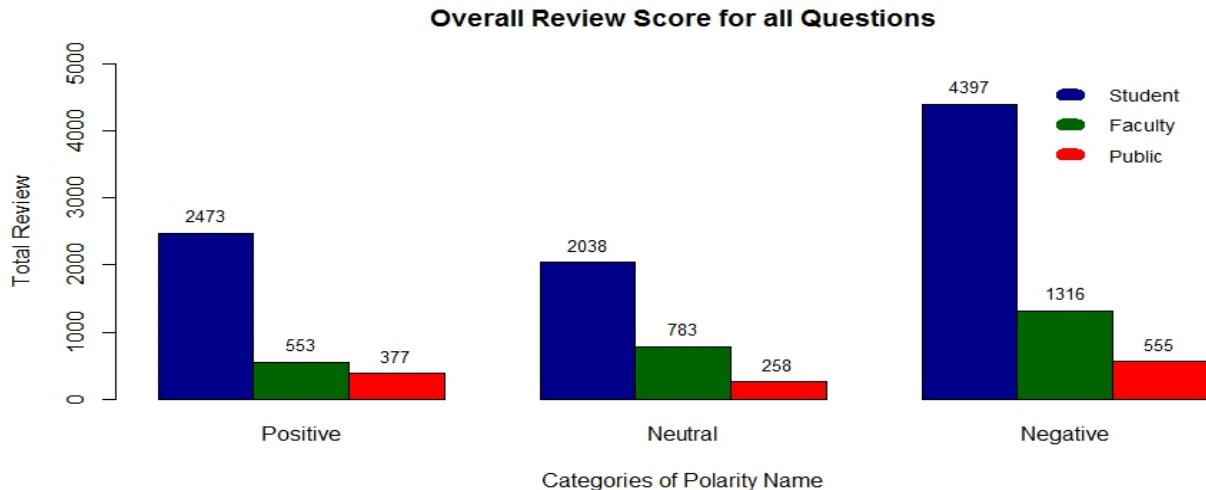
Figure 4 Represents review score for different category of reviewers

The below table 6 describes the polarity values between the state board school students and CBSE students. The following important questions are taken into consideration to predict the sentiment score between these two groups of students.

Table 6 Polarity score between state board school vs CBSE

Polarity Value /Board of school	Positive	Neutral	Negative
State Board	485	538	1665
CBSE	43	86	326

There are six most important questions numbered 1, 2, 4, 15, 16 and 17 which are used to perform the comparative studies between the State Board and CBSE students. The analysis on these preferred questions are necessary for the students who are willing to attend competitive exams like NEET, TNPSC(Tamil Nadu Public Service Commission), UPSC(Union Public Service Commission) and other important government examination. The overall sentiment score for positive polarity is 528, negative polarity is 1991 and the neutral score is 624. Based on the sentiment score it is observed that the students from both streams are not happy with the current school education system of TN. The polarity value for negative sentiment is 26.5 % higher than positive polarity and 31.3 % higher than neutral polarity values. The student participants from CBSE are 76 and state board schools are 448. Out of 526 students, 239 are male and 285 are female, which show that the ratio for female is higher than male students. Based on this observation, it is also confirmed that students ratio for state board school is larger than CBSE. Though the student ratio for state board education is higher, the right to the preparation of NEET question paper is given to CBSE School. Due to this action, the state board students are unable to score more marks in the common examination conducted by NEET for MBBS admission. The students from wealthy family only are able to get admission in CBSE schools; the people below poverty line, from rural and urban areas are totally ignored due to the admission cost of the CBSE. It is most horrible to report that the students who are economically poor could not get admission in CBSE, India, though the students are talented. Today is news (01/09/2017) from "*INDIAN EXPRESSES* "a daily newspaper in Tamil Nadu, a girl has secured 1176 out of 1200 who is unable to get MBBS admission due to NEET policies. A girl named S. Anitha from the backward Ariyalur district of Tamil Nadu was found dead at her home on Friday. She had argued in the Supreme Court last week against NEET score being sought to be the sole basis for medical admissions. According to sources, she was depressed after the refuse of apex court to exempt TN from NEET. Anitha, a daughter of laborer, scored 1,176 out of 1,200 marks in Class XII examinations on the state board syllabus in Tamil language medium. But in NEET, a national test based on CBSE syllabus she is not familiar with, Anitha managed only a score of 86. This is a real scenario of our state board school education system.

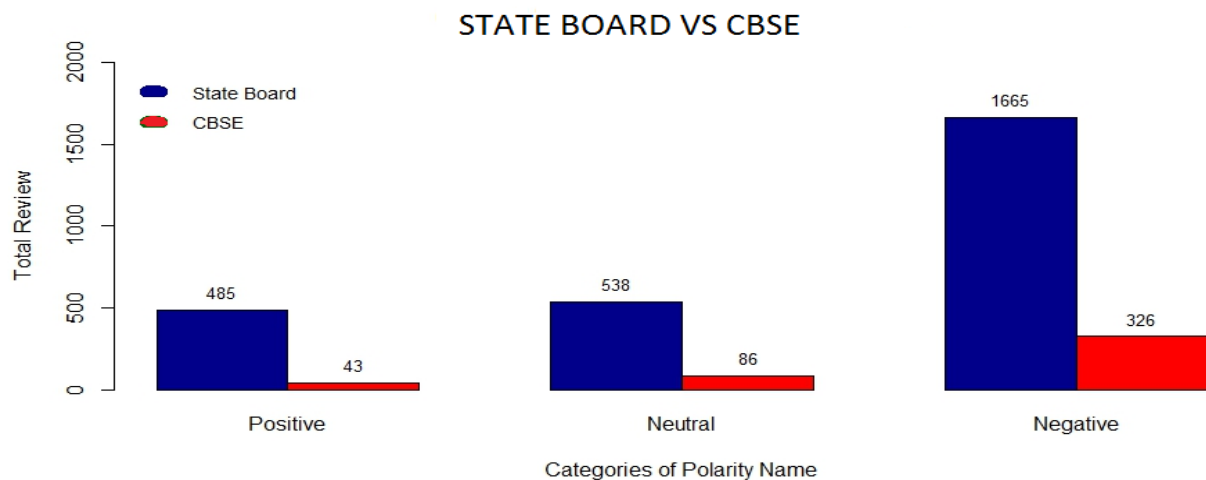**Figure 5** Graph represents the students review score between state board and CBSE

The above graph figure 5 represents the range of differences of their review score between the two streams of students about common education system.
The below question template in figure 6 describes the novel questions which are helpful in drilling out the real scenario of current education policy by gathering opinions from different field of users.

Qns 1	Does the system teach about life skills/survival skills?
Qns 2	Does it improve analytical thinking of students?
Qns 3	Is the system child centered?
Qns 4	Does it help students for competitive exam?
Qns 5	Does the system help students to discover their passions?
Qns 6	Does the system have age appropriate learning?
Qns 7	Do students have joy of learning?
Qns 8	Does the system provide uniformity?
Qns 9	Does it provide quality education to all children without any discrimination based on their eco1my, social or cultural background?
Qns 10	Is the student, completely ready for higher education?
Qns 11	Does the system give additional knowledge than Metric Syllabus?
Qns 12	Does teacher have adequate knowledge to teach Samacheer Kalvi syllabus?
Qns 13	Does adequate teacher development program conducted to improve teachers skills to meet new curriculum and syllabus?
Qns 14	Does the system provide Yoga classes for students?
Qns 15	Do state board students perform equal to CBSE students in Higher Education?
Qns 16	Do state board students get equal placements like CBSE students?
Qns 17	Do state board students compete with other students in NEET Exam?

Figure 6 Represents question template
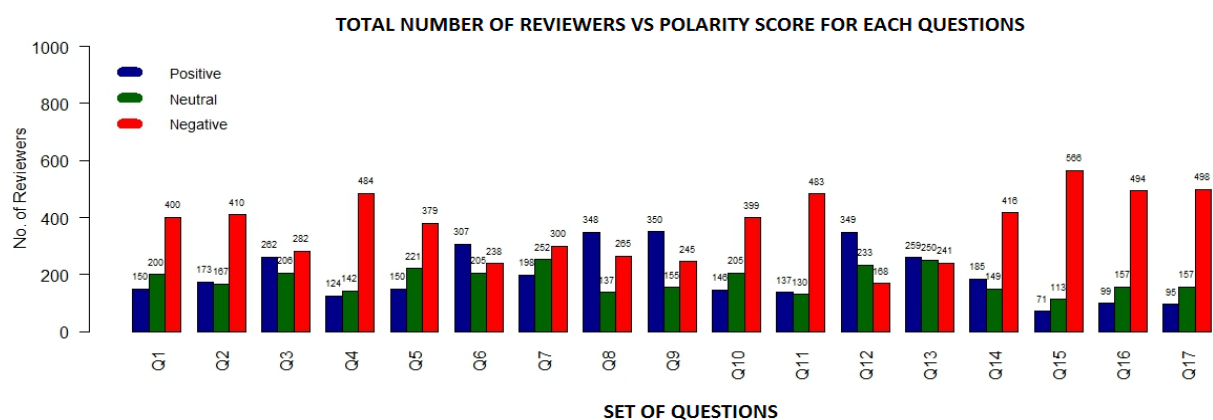
Figure 7 Represent review score of online opinion mining system

The questions in the template reveal interesting knowledge about our state school education system. Figure 7 describes the outcome of the proposed work in detail. The analysis has been made for all 17 questions where the polarity values are calculated into the categories positive, negative and neutral. The polarity score for the question numbers 6, 8, 9, 12 and 13 are positive while 1, 2, 3, 4, 5, 7, 10, 11, 14, 15, 16, 17 are negative. The above graph in figure 7 represents the total reviewer strength for each polarity against each question in the template. The question number 1 is scored highest value which is 400; this is 62.5 % higher than a positive score and 50% larger than the neutral score. The question number 2 has secured 57.8 % higher than positive score and 59.2 % larger than the neutral score respectively. Similarly, the percentage of differences for the question numbers 3, 4, 5, 7, 10, 11, 14, 15, 16, 17 are 7%, 74.3 %, 60.4%, 34%, 63.4%, 71.6%, 55.5%, 87.4%, 79.9%, and 80.9% higher than positive score, and 50%, 59.2%, 26.9%, 70.66%, 41.6%, 16%, 48.6%, 73%, 64.1%, 80%, 68.2% and 68.4 % larger than neutral polarity score. The question number 6 has secured 22.4% higher than negative score and 33.22% higher than neutral score. The question numbers 8, 9, 12 and 13 has secured 23.8%, 30%, 51.8%, and 6.94% higher than negative score, and 60.6%, 55.7%, 33.2%, and 3.47% greater than neutral score. The numbers 12, 9, and 8 are top three questions which are positively reviewed by the user while the numbers 15, 17 and 16 identified as the top three questions which are negatively reviewed by the user. According to these results, the online users are satisfied with the following aspects namely *"Uniformity", "Age Appropriate Learning", "Teacher Skill" and "Teacher Development Program"* while the other important aspects of *"Competitive Exam", "Analytical Thinking", "Life Skills" And "NEET"* are negatively reviewed by most of the users. So, these results recommend the government of TN to take appropriate action about the curriculum and syllabus pattern of the state board school education system.

CONCLUSION

In our work, we have implemented opinion mining system to predict the quality of Tamil Nadu State Board School Education System. The experimentation is conducted in two ways; the first one is implemented by extracting reviews from open web and the second one is conducted through online opinion mining system by gathering opinions from teaching professionals, students, and the public. The core of our work in the first experiment is based on the extension of the Bing Liu's opinion mining system. In this work, the aspects are ordered according to their relative importance is demonstrated successfully over the issues in the existing system for the task aspect expression extraction. The special rule that was used for the task of both subjectivity and sentiment classification has achieved remarkable performance for our domain s*amacheer kalvi*. With the novelty that we have incorporated with NLP based rule in our extension, we were able to increase the precision and recall values, when compared to the existing system. The aspect extraction and sentiment classification have been done for six different aspects in our first experiment. The polarity value for aspect "Uniformity" is secured 96 % positive score and 4% negative score while all other five aspects had shown the increased score for negative polarity of the system. As far as online opinion mining is concerned the outcome is ensured that people needed common education system with the standard curriculum and syllabus pattern which is most useful for the competitive exam conducted by the government. The experiment conducted in both cases witnessed that our classification result recommends the state board education to move from mark based system to skill based system with the revision of *samacheer kalvi* syllabus.

In future work, the primary objective should be to improve recall and precision value on the task of aspect relation extraction for finding infrequent and implicit aspect expressions. The use of ontologies as in Zhao and Li (2009), Cadilhac, Benamara, and Aussenac-Gilles (2010), and Vallés Balaguer, Rosso, Locoro, and Mascardi (2010), or other methods of studying relations between words, such as the one proposed in Bollegala, Matsuo, and Ishizuka (2007) or in Popescu and Etzioni (2005), could also be very useful to filter undesired expressions that are not components or attributes of this domain. On the other hand, it is observed that *samacheer kalvi* reviews contain an important number of expressions that have no opinions. This causes more noise to the opinion mining process. A new technique to determine opinion orientation and subjectivity need to be tested on the samacheer kalvi domain. The future work should also deal with the problem of converting aspect expressions into features. Here, the objective is to construct ontology or clusters of aspect expressions to deal with the identification of buried relation between group of aspects and opinion sentence categories. This make the system become easier to navigate and more intuitive for users.

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POWERING E-LEARNING THROUGH TECHNOLOGY: AN OVERVIEW OF RECENT TRENDS IN EDUCATIONAL TECHNOLOGIES

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ABSTRACT
In the present scenario where the technology is continually changing, there is an increased intensive competition in the e-Learning industry to make the knowledge transfer more accessible and comprehensible. Education has become much simpler with e-Learning system making it possible with a mobile device and an internet connection. Educational technology enables the learning process with the usage of the technological processes which could be categorized as computer-based technologies and mobile-based technologies. The purpose of this paper is to summarize the demands of e-Learning and also presents the various educational technologies that works in facilitating the design and application of the e-Learning systems.
Keywords: e-Learning, Educational technology, m-Learning

INTRODUCTION

As stated in the book, "e-Learning and the science of instruction" written by Ruth C. Clark and Richard E. Mayer, e-Learning can simply be stated as instruction delivered on a digital device that is intended to support learning. Educational technologies aim at simplifying the process of e-Learning by using the available resources and enhancing the experience of remote learning. As defined by the Association for Educational Communications and Technology, Educational technology may be defined as "the study and ethical practice of facilitating learning and improving performance by creating, using and managing appropriate technological processes and resources"
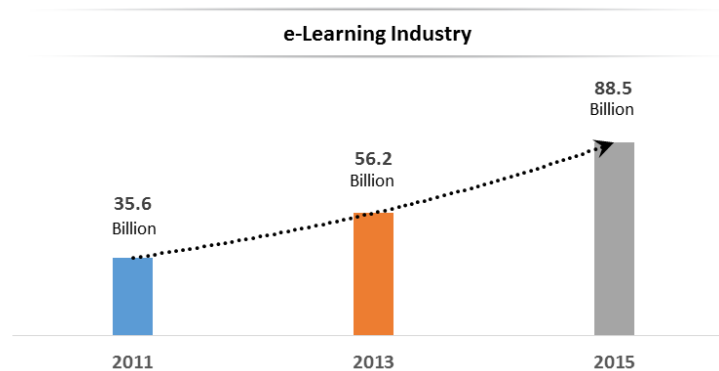
Figure 1: Growth of the e-Learning industry from 2011 to 2015

In the recent decade, e-Learning industry has seen a lot of developments in the market and the growth rate of those industries is shown in figure 1. In 2017, the number is expected to be doubled and lot of educational institutions have also adopted the e-Learning concept to improvise on the education quality. The technologies are also constantly aimed at bringing about a less expensive and effective e-Learning system.
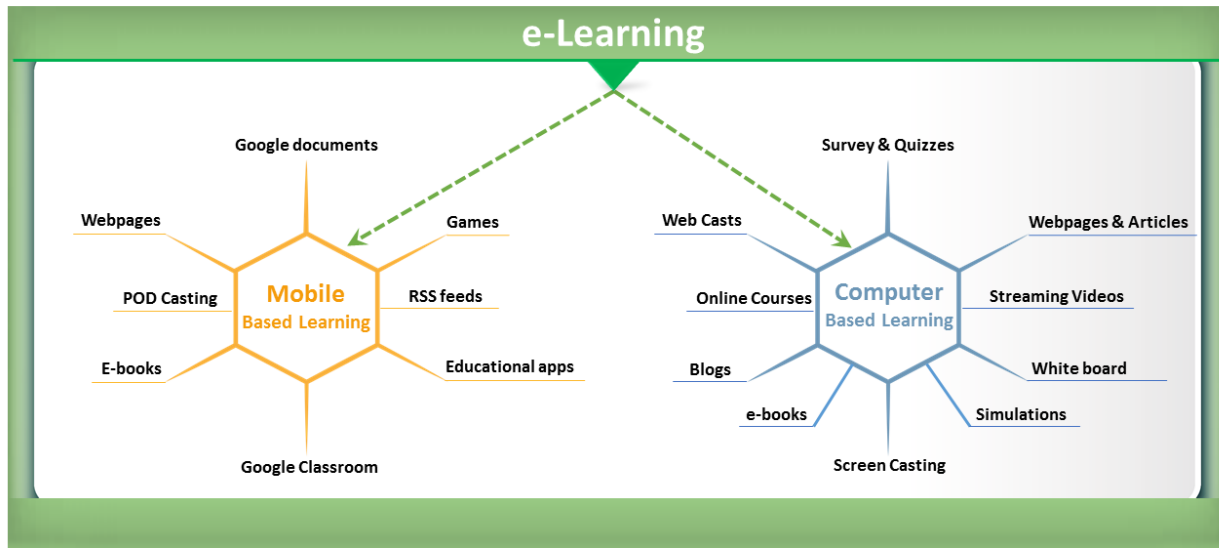
Figure 2: Applications of Mobile-based learning and Computer based learning
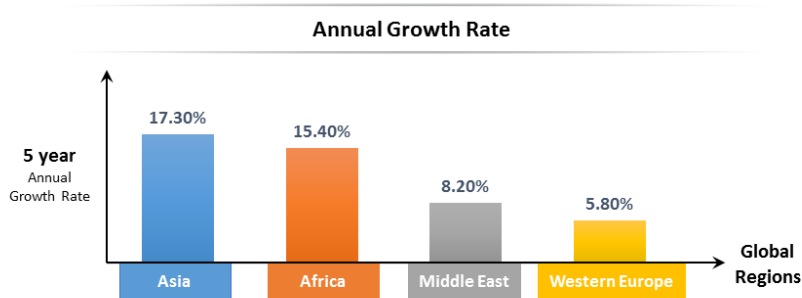
Figure 3: Five year Annual growth rate of the e-Learning industry

This paper gives an insight towards the existing educational technologies for e-Learning and the importance of multimedia based learning. e-learning is much needed in the case of distance/remote education and also requires consideration towards the time and cost savings which will enable the knowledge transfer more accessible to any part of the world.

Advantages and disadvantages of e-Learning

After an extensive research conducted on e-Learning, the advantages and limitations are listed out in the Table 1.

Table 1: Summary of advantages and limitations of e-Learning

Advantages	Limitations
Low running cost	No social interaction
Flexibility in time	Sole responsibility lies on learner
Up to date content	High development cost
Learning pace is adjustable	No individual attention
Quick grasp using multimedia content	No face-face interaction
Customization of learning content	Technology-dependent
More control over the content	Too much exposure to screen could affect health
Delivery of content can be modified	Lack of control at the instructors end
Immediate feedback	
Flexibility in location	
Access to unlimited learning materials	
Better access to the instructors	

The advantages and disadvantages of e-Learning has been summarized by referring to various technological advancements in the field of education (Virginio et al (2004), Ruth and Richard (2016)). The limitations could be considered while designing an e-Learning system and the disadvantages currently present could be overcome.

EDUCATIONAL TECHNOLOGY

Educational technology refers to the field of technology that contributes towards the development and application of the methods that aid or promote education. In can also be looked at as the study and practice of simplifying the learning process by using, creating or managing the technological resources available. Claire et al (2017) has presented a 10- year study which has exposed the variations and changes in the teaching and learning process with the aid of technology. The recent technologies in the education is categorized as mobile-based and computer-based for simplification purpose. With computers being slowly replaced by mobile devices, m-learning is gaining its popularity in the field of education.

There are a variety of applications that are employed in both computers and mobile devices. The figure 4 shows these applications that are categorized under computer based and mobile based technologies.
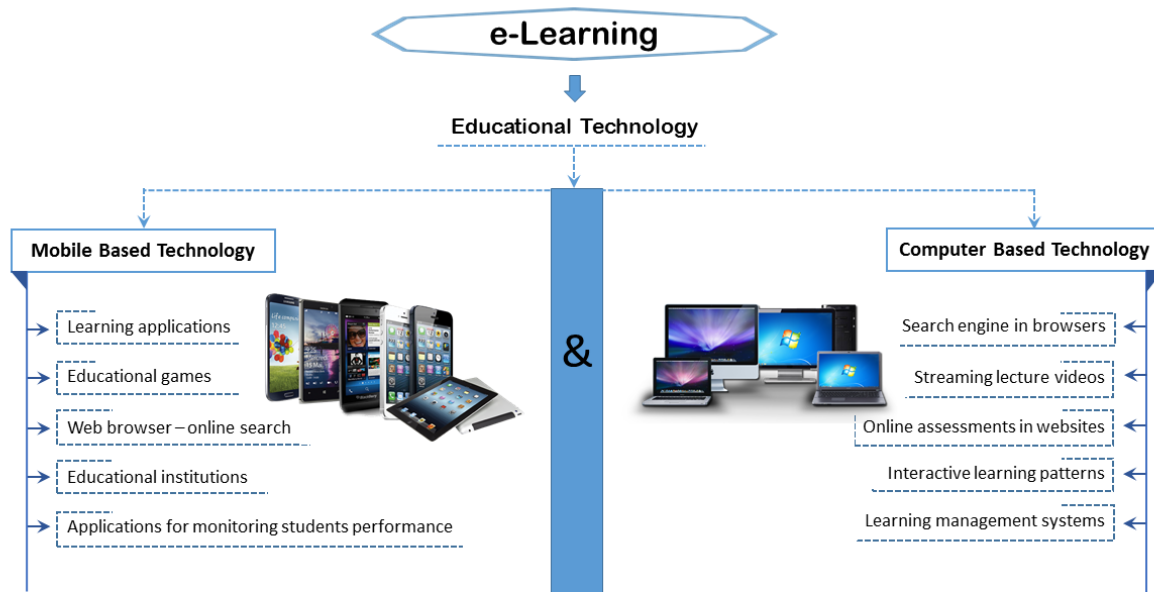
Figure 4: Categorization of Educational Technologies

COMPUTER-BASED TECHNOLOGY

Computer based technology has been existent from the very start of the e-Learning industry. Teaching and learning methods that employed computer based technologies has benefits compared to the traditional approaches starting from the very use of search engines to employing computer based educational games. Bruce et al (2017) performed a study and found that the students performed better with the use of mathematical educational game. This proves that the use of computer based technology definitely provides greater learning opportunities to the students.

Search Engine

The very basic type of learning using the computer would be using the search engine for browsing and the application used for this are the web browsers. The number of lecture videos and the tutorials have increased in number over the decade. Lot of research work is carried on to achieve an energy efficient streaming for the educational videos online.

LMS

LMS (Learning management systems) is being actively used in the educational institutions for the management of the study materials. They help in administrating the tools that are used by the instructors and also aids in the distribution of the course materials, assignments and so on. In all the research being carried out in e-Learning, communication and collaboration among learners is considered important. Thus LMS provides a good solution by letting the students communicate with peers and tutors and also learn together online. Recent research conducted by Zanjani et al (2017) provides the LMS design factors that affects the user engagement by engaging the e-learning tools and as a result found that the factors affecting the user engagement were user-friendly structure, reducing the number of tools and links, privacy support, anonymous posting and customized student-centered tools. Considering the factors that affects the design, a better learning management systems could be created.

Computer based assessment

Computer based technology offers many innovative methods of assessments and an effective feedback system. A wide range of adoptions are available to make this computer assessment more interactive and effective. Scalise and Gifford (2006) in their paper have researched on the assessment techniques available in the computer based technology and have come up with 28 innovative types. This has provided a framework paving way for the discussion of assessment techniques which are innovative and effective in the computer based settings.

MOBILE-BASED TECHNOLOGY

With almost everyone owning a mobile device, the mobile learning could be considered as the next generation learning. Using the mobile technology for any type of learning model can be termed as m-learning. Mobile-based learning mainly includes the educational games, web-browsing, streaming audio-video, MMS and so on using the most recent of technologies. M-learning makes use of the multimedia components and communication and it also offers flexibility in time and location.

The educational use of the mobile phone was researched by Zahra and Amir (2012) and their research findings elaborate of the mobile based learning by the University students. The examination of the university students who used the mobile technology for education was conducted and found that the percentage of the students who used the mobile phones particularly for education was less. This has changed over time in a span of five years. The recent research conducted by J. Joo-Nagata et al (2017) have shown a high acceptance among students and resulted in a positive response. Mobile based educational technology was reviewed in Japan by Patricia & Chris (2005) where English lessons were sent through the mobile phones and a high effectiveness in the education was shown.

Mobile Games

Using mobile games as a mean of education creates an active and fun environment to the learning process. Educational games are being designed for the teaching specific tasks and mastering a particular field. There are few examples of such kind, one of which Ketamo (2002) has designed a game for kids at the age of 6 to teach geometry and also Goth et.al (2004) have developed a game for university students to learn the campus of the University and Zimerman, Barnes and Leventhal have explored the options of employing 3D graphics in the process of learning the art of Origami. J. Huizenga et al (2009) have discussed the effects of a mobile city game called Frequency 1550 and have performed an experimental study on the students of secondary education. The results of the study shows that the students who played the game had higher scores in the knowledge test compared to those students who did not play the game prior to the knowledge test.

Learning Applications

As mobile applications are increasing in number, there are a wide range of educational applications that have come in the recent past. Learning through mobile application makes the process of learning more personal and easier. In a research conducted by Fernando (2011) a framework was formed to evaluate different language learning applications and also the current research on potential learning applications was conducted.

CONCLUSION

Educational technology is about using the technological processes to enhance the learning experience making it easily accessible and comprehensible. This has been dealt according to the present day scenario by classifying it into computer-based technologies and Mobile-based technologies. This paper has thus dealt with the latest technologies available in the field of education that facilitates the design and application of the e-Learning systems.

FUTURE DIRECTIONS

In today's world the computers are slowly being replaced by the mobile phones, PDAs and tablets so it is sensible to design the learning materials which will suit both the devices thus inter-operability is expected

Collaborative learning is already existing but a few additions would add the benefits of traditional class room training to e-Learning

Using the present technologies, energy efficient streaming methods could be designed which will provide a cost effective streaming of lecture videos

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PROPOSAL AND VALIDATION OF A QUESTIONNAIRE OF EVALUATION OF THE ONLINE TEACHING PRACTICE THROUGH THE STUDENT OPINION

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ABSTRACT
Teaching evaluation is a process in which improvements can be done in the teaching-learning process. The students are the ones who can evaluate teaching activity according to their experience and satisfaction in relation to the acquired knowledge. The objective of this project was to create an assessment instrument of the online teaching practice through student feedback. This study collected comments of 110 students that have taken online courses at the Autonomous University of Ciudad Juarez (UACJ). A questionnaire of 16 items with Likert scale was drawn up, considering the course organization, pedagogical dynamics, evaluation, and personal and academic traits. The opinion of the students was transcribed, classified, and codified in similar conceptual variables; from this analysis the questionnaire was restructured resulting in an instrument of 13 items. This instrument was evaluated on an online pilot test applied to 441 students from online courses. The validation of this instrument was estimated through reliability testing based on Cronbach's alpha. The analysis of the internal consistency of the instrument based on the Cronbach's alpha was 0.9. The evaluation of this coefficient is rated as excellent, so the instrument is viable and reliable to evaluate the teaching practice of online courses at UACJ.

INTRODUCTION
Learning is the primary objective of any training event and, as such, is the result of the quality of teaching in higher education. Although quality is a broad and complex term to measure in education, an important factor is the practice or performance of the teacher. Therefore, it is important to evaluate the teacher's activity in terms of academic performance, compliance with curricular objectives, teaching activities, teaching techniques, levels of interaction with students, etc.

Most teachers, mainly at the undergraduate level, have little formal training in teaching techniques, in the evaluation of student learning or in the evaluation of teaching effectiveness (NRC, 2003). However, there are guides or basic principles that are evaluable in the online teacher. Nevertheless, as mentioned by Puente and Santoyo (1998), the measurement of teacher performance is dictated by the student, it is the one who decides whether the performance is efficient or not. An appropriate teaching performance would be one that, according to Ellis (1993), complies with the rules and activities that must be implemented to achieve the specific learning purpose of the student. Therefore, it is established that from the student opinion can be recognized the teaching performance. Although several authors have mentioned the important features of effective teaching in traditional

classrooms, an effective teacher in an online course may seem very different to students. This makes it necessary to modify the instruments of data collection used for the evaluation of the face-to-face teaching performance and to couple it with the characteristics that a student identifies in the virtual environment.

The most frequent instrument of evaluation of teaching practice is the questionnaire (Arribas, 2004). For the design of a questionnaire it is important to define the aspects to be measured or constructs, for this, it is necessary to consult the background, opinions of experts or gather information through interviews with focus groups. The questionnaires are composed of many items that must be evaluated for their validity and reliability (Alexandrova and Haybron, 2016). A measuring instrument is reliable if it provides approximately the same type of responses for different groups of students or in repeated applications to the same group of scholars. The reliability of the internal consistency of the instrument can be estimated by Cronbach's alpha (Cronbach, 1950). A questionnaire assessing online teaching practice with acceptable reliability or a Cronbach alpha greater than 0.7 (George and Mallery, 2003), would provide feedback on strengths and areas in which the University can focus efforts to improve online courses. For this reason, the objective of this study was to construct an instrument of evaluation of the teaching practice in the online modality, through the student opinion.

METHODOLOGY
Participants
To carry out the Assessment Instrument of the online modality, an interdisciplinary team of experts was created. The team was composed of a representative of each of the four institutes of the University, a member of E-learning, and a member of Teaching Evaluation. The study considered the opinions of the students of four institutes, IADA, ICB, ICSA and IIT, and the division of multidisciplinary studies of CU.Focus groups were formed with 110 students, allocated in five classroom-based focus groups and one online focus group belonging to the different institutes. To analyze the reliability of the assessment instrument, a pilot test was applied to 441 students of the UACJ that have taken at least one online course, they represent 21% of the student population that took online courses on the semester prior to the previous semester.

Assessment Instrument
In the first stage, the Instruments of Teaching Evaluation of the classroom-based courses of each institute were considered to identify the aspects to be evaluated and to differentiate the relevant ones in the online modality. The following instruments were analyzed: 16 items of IADA-Architecture, 15 items of IADA-Art, 17 items of IADA-Design, 14 items of ICB, 18 items of ICSA, and 18 items of IIT; all the instruments take into consideration for the evaluation the dimensions of Course Organization, Pedagogical Dynamics, Evaluation and Qualification Criteria, and Personal and Academic Traits. Based on the results of the Instrument of Teaching Evaluation review of the classroom-based courses, the first revision of the Instrument of Teaching Evaluation for the online modality was done. The resulting instrument was restructured according to an exploratory test with experts and focus groups. The importance of this exploratory test with focus groups consist of collecting information of participants' personal experiences (Powell and Single,1966) and transform them into qualitative data (Hamui-Sutton y Varela-Ruiz, 2013). Considering the nature of the instrument to be proposed and the type of interaction with the students that take online courses, an additional online focus group was created to collect the information and experiences of the participants (Adler *et al*., 2002; Tates *et al*., 2009). Each classroom-based focus group was moderated by two experts during 45 to 60 minutes sessions, starting from a semi-structured guide, the sessions were recorded with the previous authorization of the participants. The online focus group took place via Campus Virtual Institutional (Moodle platform) and an expert moderated it in asynchronous mode for 15 days.

Subsequently, the collected data of the classroom-based focus groups were transcribed and the data from the online focus group were recovered through Campus Virtual to be analyzed. From the obtained data, comments represented similar criteria were selected. These comments were grouped and a variable or a keyword was assigned to each of them. From these variables, as indicators, the instrument was reconstructed in the four dimensions.

Pilot test
The pilot study created to verify the internal consistency of the instrument (annex 1) was carried out online individually and anonymously to 441 students of the UACJ that had taken at least one online course.
Analysis of the results
The validation of the instrument was analyzed through reliability tests based on Cronbach's alpha (Cronbach, 1950; Peterson, 1994), in the statistic program SPSS Statistics 24.0® (SPSS Inc, EE.UU.).

FINDINGS

In this second stage, a methodological contribution, in both, the generation and validation of an instrument of the student opinion for the online teaching evaluation were sought after.From the analysis of the information obtained from the focus groups, the group of experts identified thirteen common indicators that were contemplated in the pre-test.The indicators were assigned to the corresponding dimension and thus the questionnaire was designed to be evaluated by the pilot testthrough a Likert scale (Table 1).

Table 1. Questionnaire

Item	Always	Very often	Someti mes	Rarely	Never
Course Organization					
1. The student guide was presented at the beginning of each unit (objective, content, instructions for each activity, ways of evaluating, materials and curricular resources to be revised.					
2. During the course, the instructions, resources, due dates for each assignment are explained and easy to identify if needed.					
3. The activities carried out are closely related to the content of each unit.					
4. Timeframes for assignment completion and delivery were at least seven days.					
Pedagogical Dynamics					
5. Course content was linked with case studies and practical examples.					
6. Questions were answered in less than 48 hours.					
7. During the course, participation (discussion, debate, collaborative work, research work and writing) was encouraged					
8. Different data sources were used during the course (bibliography, data base, manuals, catalogs, journals, videos and multimedia files).					
Evaluation and Qualification Criteria					
9. Assignments were revised and returned to students no later than seven days after the due date.					
10. The evaluation of each activity was based on criteria established for each unit.					
Personal and Academic Traits					
11. The professor showed interest in your learning process.					
12. The professor communicated in a kind, respectful manner.					
13. The professor is knowledgeable in the topic and able to clarify doubts and questions.					

The reliability test made for thirteen items that form the questionnaire was made based on the Cronbach's alpha (Cronbach, 1950), where values over 0.7 were taken as acceptable. The result was satisfactory and superior to 0.90 (N=13), so this indicates that the instrument is fully valid.

However, to determine if there were trivial indicators or items, tests were made to determine if removing some of the items could improve the alpha index of Cronbach. Table2 shows the analysis of the validation with each of the indicators that form the evaluation card.It was determined that is not necessary to remove any item, since the exclusion of any of them (given in the fourth column of estimations), does not improve the alpha index of Cronbach, given that in any of the cases the obtained score is inferior to 0.909 when fully analyzed.

Table 2. Validation analysis

Indicator	Mean of the scale if an item is deleted	Variance of the scale if an item is deleted	Correlation of the total items corrected	Cronbach Alpha if eliminates one item
1. The student guide was presented at the beginning of each unit (objective, content, instructions for each activity, ways of evaluating, materials and curricular resources to be revised.	53.89	65.619	.636	.902
2. During the course, the instructions, resources, due dates for each assignment are explained and easy to identify if needed.	54.16	63.346	.634	.902
3. The activities carried out are closely related to the content of each unit.	53.87	66.967	.590	.903
4. Timeframes for assignment completion and delivery were at least seven days.	53.86	67.568	.564	.904
5. Course content was linked with case studies and practical examples.	54.31	63.310	.594	.904
6. Questions were answered in less than 48 hours.	54.24	61.631	.675	.900
7. During the course, participation (discussion, debate, collaborative work, research work and writing) was encouraged	54.34	62.943	.576	.905
8. Different data sources were used during the course (bibliography, data base, manuals, catalogs, journals, videos and multimedia files).	54.07	64.909	.640	.901
9. Assignments were revised and returned to students no later than seven days after the due date.	54.20	62.951	.661	.900
10. The evaluation of each activity was based on criteria established for each unit.	53.95	64.066	.731	.898
11. The professor showed interest in your learning process.	54.16	62.39	.686	.899
12. The professor communicated in a kind, respectful manner.	53.78	67.467	.619	.903
13. The professor is knowledgeable in the topic and able to clarify doubts and questions.	53.89	65.619	.636	.902

However, to revalidate the obtained result in previous tests, another test with two halves was generated. This means, the number of items in the test were split into two parts, making an analysis on the seven indicators in the first part, leaving the rest of the items in the other half. The obtained results can be appreciated in Table 3, it is noted that the results are satisfactory, obtaining a Guttmann Test score of 0.926 and the Cronbach's alpha index is more than 0.7, which is the minor acceptable score.

Table 3. Revalidation with two halves

Cronbach'salpha	Part 1	Value	**0.818**
		N elements	7
	Part 2	Value	**0.838**
		N elements	6
	N total elements		13
Correlation between forms			0.874
Spearman-Brown Coeficient	Equallength		0.933
	Unequallength		0.933
Two halves of Guttman			0.926

As the questionnaire indicators were grouped into four categories or dimensions, the validation analysis was also performed on the function of those dimensions. Table4 shows the results in the categories: a) the Cronbach alpha acceptable score and b) the proof that no items need to be eliminated in order to improve these indices.

Table 4. Analysis by dimension summary

Dimension	Cronbach'salpha	N elements
Course Organization	.746	4
Pedagogical Dynamics	.786	4
Evaluation and Qualification Criteria	.719	2
Personal and Academic Traits	.70	3

Additionally, it was interesting to perform a univariate descriptive analysis of each of the items, obtaining the median of the valuations issued to understand which questions are significant for the students in the questionnaire. Such analysis is shown in Table 5, where items are arranged in ascendant order according to the obtained median.

Table 5. Univariate descriptive analisys

Indicator	25	50	75	RI
12. The professor communicated in a kind, respectful manner.	4.347	4.875	5	.653
1. The student´s guide was presented at the beginning of each unit (objective, content, instructions for each activity, ways of evaluating, materials and curricular resources to be revised.	4.271	4.813	5	.729
13. The professor is knowledgeable in the topic and able to clarify doubts and questions.	4.271	4.813	5	.729
4. Timeframes for assignment completion and delivery were at least seven days.	4.265	4.804	5	.735
3. The activities carried out are closely related to the content of each unit.	4.270	4.804	5	.730
10. The evaluation of each activity was based on criteria established for each unit.	4.207	4.754	5	.793
8. Different data sources were used during the course (bibliography, data base, manuals, catalogs, journals, videos and multimedia files).	4.085	4.648	5	.915
11. The professor showed interest in your learning process.	4.044	4.632	5	.956
2. During the course, the instructions, resources, due dates for each assignment are explained and easy to identify if needed.	4.039	4.627	5	.961
6. Questions were answered in less than 48 hours.	3.972	4.597	5	1.028
9. Assignments were revised and returned to students no later than seven days after the due date.	3.967	4.583	5	1.033
7. During the course, participation (discussion, debate, collaborative work, research work and writing) was encouraged.	3.606	4.509	5	1.394
5. Course content was linked with case studies and practical examples.	3.651	4.506	5	1.349

Based onresults of Table 5, it can be concluded that the most important items for the student that evaluates teachers are:

- Item 12 which refers to the teacher approaching the student in a cordial and respectful manner.

- Item 1 refers to the teacher delivering a guide for the student when every module or unit starts, where objectives, content and indications for every activity can be consulted.
- Item 13 refers that the teacher must denote dominion of the subject and answer the students´ doubts about the class.
- Similar interpretations for the rest of the items.

It is necessary to understand that, according to the Likert scale, which has a scale between one and five, item number five has a median of 3.651, which means that it is regularly important.

In the same way,the fourth column shown the interquartile range that is a dispersion method of the emitted values (difference between the third and the first quartile). According to that, small values indicate that there is a consensus among the respondents and the big values mean the absence of that consensus. Based on values in Table 5, it is noted that there's an adequate consensus from opinions emitted in relation to the mean values of the items.

CONCLUSIONS

The reliability measure through Cronbach's alpha assumes that the thirteen reactants from the generated evaluation instrument, evaluated by a Likert scale, measures the same construct of teacher's evaluation and is highly correlated. The value of Cronbach's alpha coefficient evaluation is 0.9, rated as excellent, meaning the questionnaire is valid and affordable to evaluate teacher's practices that teach in E-learning modality in the Autonomous University of Ciudad Juarez.

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SCALABLE MULTIMEDIA CODING FOR STREAMING LECTURE CONTENT IN E-LEARNING SYSTEM

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ABSTRACT
A new framework SMCeL (Scalable Multimedia Coding for e-Learning) that allows scalable multimedia content transmission by estimating the bandwidth of the client's network is proposed. By evaluating the network condition, the multimedia content is delivered. Scalable multimedia coding (SMC) is the encoding of a high quality multimedia bitstream which in turn contains one or more subset bistreams. A subset stream is achieved by dropping either video packets or transmitting only the audio packets to reduce the bandwidth constraint for the subset bitstream. Hence, the multimedia lecture content is delivered according to the network condition of the client which enables the client (student) to view the main content of the lecture even in poor network conditions.
Keywords: Multimedia streaming, Streaming media (SM), Bandwidth

INTRODUCTION

Multimedia streaming applications are becoming increasingly popular in everyday life. In this fast pace world, multimedia is in increasing demand as the mobile devices have gained its popularity in the last few years. Wireless multimedia streaming is still a challenging task because of the change of wireless networks, bandwidth constraints, packet loss, and other computing capabilities of the mobile clients.
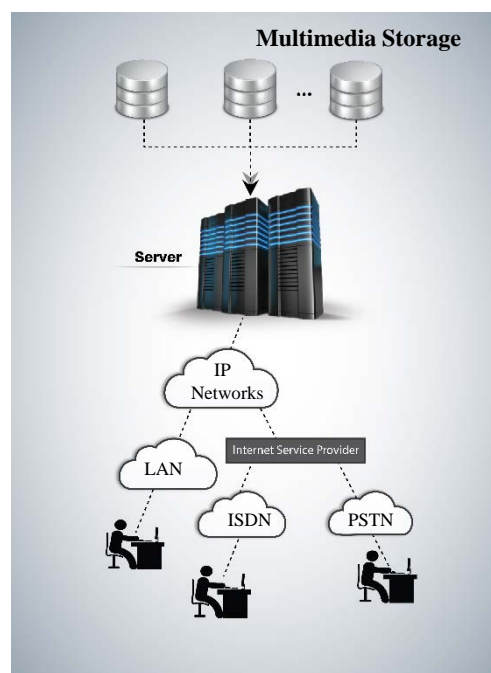

Fig. 1: Users can access the multimedia database over networks for streaming multimedia content

Streaming is defined as the process of playing a particular file while it is still downloading. Multimedia streaming is where a user views or hears the multimedia content while it is still being downloaded. This can be referred as 'Streaming Media' (SM) (Fig. 1). There are a lot of multimedia content available for a various range of applications including video conferencing, remote learning, multimedia presentations, video archives and libraries and so on.

When the user sends a request to display the multimedia content that is stores on a remote server, the data are retrieved from the server over a network and is sent to the client for display. There are two ways in which the data is passed onto the client for display.
  ➢ Store and Display model
  ➢ Remote Streaming model
In case of 'Store and display', the SM objects are downloaded entirely from the server to the local storage before the display process is initiated whereas in the 'remote streaming' the data are retrieved from the server over a network and are displayed to the client while it is still being downloaded. Both the models that have been mentioned above have their own advantages and disadvantages.

Advantages of Streaming over Store and display model:

  ➢ No need to wait for the whole file to be downloaded
  ➢ No copies of the data will be stored locally
  ➢ No storage requirements at the client side
  ➢ Suitable for live events

Limitations of Streaming:

  ➢ Playback solely depends on the network connection of the client
  ➢ Slower playback
  ➢ Lost/damaged packets might cause coarse playback of video

The focus here is on the limitation of the streaming that requires the streaming going on even in the poor network condition without any intrusion in the playback.

The remainder of this paper is organized as follows: Related studies deals with an overview of the existing system and explains the novelty of the proposed system (SMCeL). The next section presents the proposed system with the help of the relevant diagrams. The algorithm that has been employed in the SMCeL framework is followed. The results of the simulation and an insight in to the advantages of the proposed system is discussed under results and discussion. Finally, a summary of the paper and also discussion about the future scopes are dealt.

RELATED STUDIES

Previous research works that has been carried out by Reibman et al (2003), Benzler et al (2000), Wang et al (2003), Schierl et al (2007) and Chou et al (2004) focuses on the video quality adaptation according to the network conditions but none of them are specially designed for educational multimedia content. Since Multimedia streaming is necessary in developing e-learning and mobile learning systems (Dorai et al (2001), Leung et al (2003) and Liu et al (2002)). There have been lot of research work carried on scalable video coding (Reibman et al (2003), Benzler et al (2000), Wang et al (2003), Schierl et al (2007) and Chou et al (2004)) network bandwidth allocation (Legout et al (2001) and Chou et al (2004)), and video streaming which is discussed in papers by Won et al (2014), Kennedy et al (2011), Falik et al (2010) and Pudlewski et al (2011).

In Scalable video coding, the network conditions of the client is analysed and thus depending on the available bandwidth, the enhancement layers are added onto the base layer which means, a client with a poor bandwidth receives a low quality video and the client with a higher bandwidth receives a better quality video with all the enhancement layers.
For different network conditions, different quality video is being delivered in the case of scalable video coding explained in the following papers by Reibman et al (2003), Benzler et al (2000), Wang et al (2003), Schierl et al (2007), Chou et al (2004), Li et al (2008), Wu et al (2001) and Lu et al (2013).

In wireless streaming of lecture multimedia content, it is important that the main content of the lecture is being delivered to the client. For example, even for the client with a poor network bandwidth, the content of the lecture has to be somehow delivered.

Considering the above issue, a framework of encoding multimedia content as different subsets is provided, also determination of what content has to be delivered to the client depending on the network conditions of the client. Different versions of the lecture multimedia content will be available while encoding it to the storage server.

- Video & Audio (High rate network connection)
- Text (with low resolution) & Audio (Low rate network connection)
- Only Audio (with low quality) (Very poor network connection)

SMCeL framework (Proposed Method)

A framework is designed considering the fact that there would be varying network conditions across different clients. The figure 2 explains the overall architecture of the proposed system. The multimedia lecture content is encoded in different forms to the local storage server which is then transferred to the web server. The clients who request to access the multimedia content would receive the version of the lecture content which is suitable for their network condition.

The idea behind the proposed system is that the client (students) who have poor network condition should also be available to the lecture content available online. Thus there are different version of the content available in the local storage. The multimedia lecture content is made available to all the clients irrespective of the network condition. Hence all the clients (students) will be able to have an access to the lecture content they need.
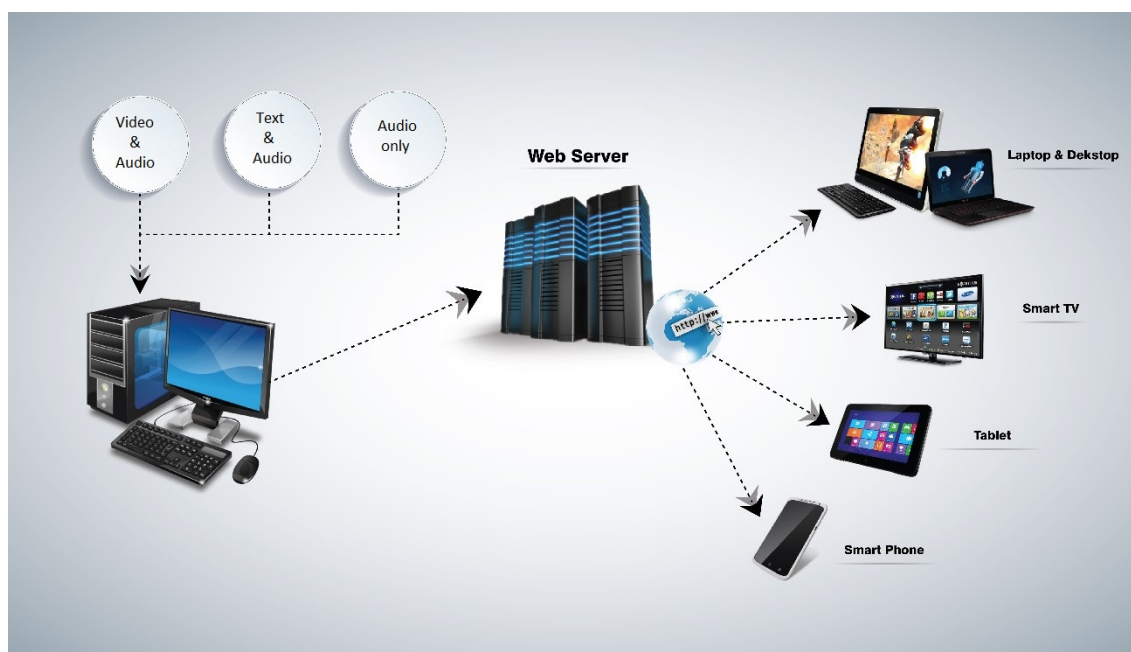
Fig 2: SMCeL Architecture

There are two stages in the proposed system: the encoding stage and the decoding stage. Fig. 3 explains the encoding stage. In this stage, the multimedia content is being encoded to the server and is available in different versions.

At the given transmission time t, the network bandwidth T_c of the Client is estimated. A threshold T_i is set so as to decide on the client's network condition.

- Condition 1: If T_c is greater than T_i ($T_c > T_i$) then the first quality video as well as audio will be transmitted to the client.
- Condition 2: If T_c is lesser than the T_i ($T_c < T_i$) then only the text and the audio of the lecture content is made available to the client. The threshold T_i is set low that only in poor condition this condition is applied.
- Condition 3: A new threshold value T_n is set as the worst case scenario, if T_c is lesser than T_n ($T_c < T_n$) then the video packets are dropped and only audio is delivered to the client.

ALGORITHM

Phase 1:

In this phase, the determination of the multimedia content that has to be transmitted to the client is performed. As explained in the previous section, each threshold *Ti* is associated to the multimedia content to be sent. This phase is executed periodically, to check if a new threshold has been reached.
End phase 1.

Phase2:

In this section the algorithm is used to find out what multimedia content would be suitable to be transmitted across to the clients.
The following steps are performed:

Step 1	Encoding different versions of multimedia lecture content
Step 2	Analyse the network condition of the receiver
Step 3	Decision making performed on the multimedia content to be sent
Step 4	Sending of data to the destination.

End Phase 2

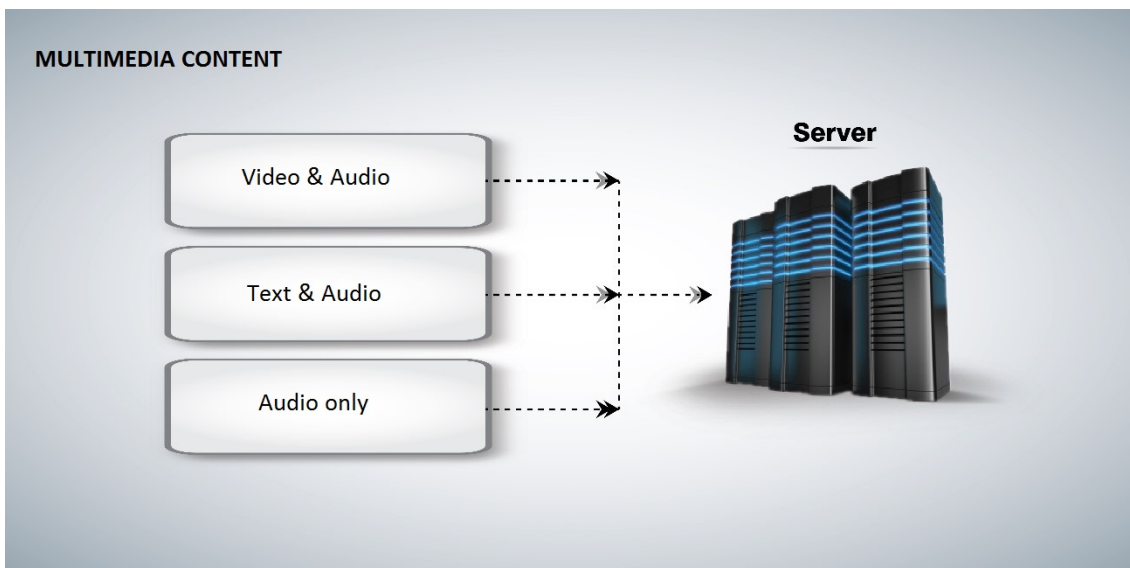Fig. 3: Encoding multimedia content to the server

The third condition is considered in the worst case condition in which the client/student is in need of the content, for example, if he/she has an exam coming up and needs the lecture content then there is at least the audio delivered to the student than giving nothing.
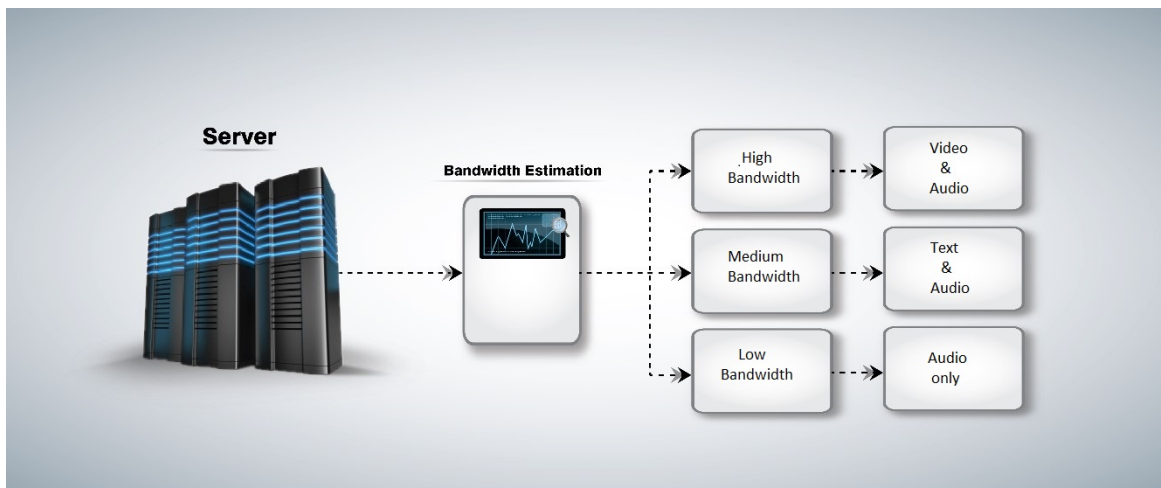

Fig. 4: Decoding multimedia content depending on the client's network conditions

RESULTS & DISCUSSION

The main aim of this research proposal is to make the lecture content available to the students irrespective of the poor network conditions. We consider the scenario in which the student requires the lecture content, for example, during an assessment time and stuck with a poor bandwidth, hence unable to go through the content. In this case, the core lecture content is aimed at somehow being delivered to the student.

Fig 5: Multimedia streaming in high speed network condition

Fig 6: Streaming only audio for poor network condition.

The prototype of the SMCeL design suggested is shown in the figures (Figure 5 &6). This proves the effectiveness of the system that delivers the multimedia lecture content according to the network conditions of the student.

CONCLUSION & FUTURE DIRECTIONS

In this paper, SMCeL framework has been presented which is scalable multimedia content transmission of lecture videos over wireless networks. Real time evaluation of network condition and scalable multimedia content transmission are provided. Different multimedia content transmission for varying network conditions of the clients is provided.
The system could be further improved by analysing the energy consumption characteristics and employing packet scheduling algorithms to bring about energy efficiency in the proposed framework. The efficiency of multimedia streaming system for education will be further investigated and its social effect on students will also be covered as future work of this paper.

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THE IMPORTANCE-PERFORMANCE ANALYSIS (IPA) ON ACADEMIC AND NON-ACADEMIC SERVICES TO ENHANCE STUDENT MOTIVATION

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ABSTRACT

Student motivation has long been an important factor to learner's success. In Open and Distance Learning (ODL) System particularly, student motivation plays a vital role in student persistence and hence to their study completion. The learner's motivation may derive from both institutional and personal factors. This study focuses on the institutional factors by contrasting the student's perceptions of the importance of the university services and student's satisfaction to those provided services. The Importance-Performance Analysis (IPA) of Student-Faculty of Teacher Training and Education of the Indonesia Open University was conducted on both university's services related to academic and non-academic services. The sample of students was drawn from the active student in online learning, Questionaire was distributed online. The research was analyzed using Importance-Performance Analysis method. The research showed that 98% positively overlap between student perceptions of the importance of services and their satisfaction. It means that the provided academic and non-academic services are being in conformity between student needs and expectation. However, based on the quadrant analysis the learning materials are located in Quadrant II that is quite distinct from the student's perception of the importance and their satisfaction. That means UT needs to improve its learning material related academic services, especially the services offered by UT's Online Book Store.

Keywords: Academic and Non-academic Services, Satisfaction, Importance-Performance Analysis

INTRODUCTION

In Open and Distance Learning (ODL) system student support services both academic and non-academic serve a pivotal role in student success as student relies entirely on those support services. Without adequate student support services, student independent learning may not be assured (Holmberg, 1989). Those practices are also adopted by Universitas Terbuka, Indonesia (UT). Considering the importance of student support services to their success. It is important to research on how importance and satisfaction of those services to the student. By contrasting those student perceptions of the level of importance and satisfaction it may reveal the level of priority support services needed by the student. Therefore, UT may focus on the required support services.

Open university services aim at meeting student's expectation with the provided service. The "satisfaction" comes from Latin "satis" (which means good enough, to content) and "facio" (do or make). Students' satisfaction is a situation when all the wishes, expectation, and importance of students are fulfilled (Srinadi, 2008). Students' satisfaction is students' positive response to a higher education's services because of the suitability between expected service and perceived service (Sopiatin, 2010). Thus, in higher education, student satisfaction occurs when perceived performance meets or exceeds the students' expectations (Mark, 2013; Sopiatin, 2010; Supranto, 2011; Kotler, 2000). As students evaluate the quality of the service, they used to compare their experienced performance with their expected performance (Wright, 2002). Sweney (2016) identifies a number of factors that influence student satisfaction, those are the financial anxiety, the quality of lecturers and teaching performance, student involvement, learning resources, facilities, and social life.

According to Musahadi (2014), the criterion of student's satisfaction includes: (1) If the performance is under-expectation, students' will be dissatisfied, (2) if the performance happens as expected, students will be satisfied, (3) if the performance is beyond expectation, students will be very satisfied. This feeling of dissatisfaction, satisfaction, and great satisfaction will affect the next performance. Students who are satisfied will describe respond positively to the services that they used/perceived.

In addition, as a consumer of educational services, students have an expectation to succeed. It is followed by their expectations for the learning process, such as services, facilities, lecturer's quality, and leadership. Based on that expectation, every student has different perception one to another. There is the high-standard perception that cannot be fulfilled by the institution while there are also medium and low perceptions.

Every university who puts its great effort to increase high expectation for their students and support them to achieve those expectations will attain successful academic. The students' expectations, as the main consumer, our expectations regarding hardware (non-human element), software (human element), hardware and software quality as well as additional value from learning process (Sopiatin, 2010). The expectations of students may be influenced by their individual needs, communication with the institution, mouth-to-mouth (direct) communication, etc. (Sweeney, 2015).

By considering two-dimensional student's perception of the importance of services and their expectation, the Importance-Performance Analysis (IPA) method will be used. The IPA is firstly introduced by Martilla and James (1977) to measure the relationship between consumer perception and priority of product/ service quality improvement. IPA is used to map the relationship between expectations and the performance of each offered statement and the gap between performance and expectations of the statement. The target is evaluating certain attributes of the facility or services about the importance of the evaluator and the organization's features performance. The research will explore and examine the Importance-Performance Analysis of UT's students towards the provided services related to academic and non-academic services. This research is important to

discover the gap of the students' perception of the importance and expectation of services.

RESEARCH METHOD

The sample of this research was the students of Faculty of Teacher Training and Education (FKIP) that had the highest number of students in Open University. The respondent was FKIP students who purposively fill the online questionnaire in 2015. The instrument was developed based on five services provided by UT. Below are instruments' indicators of students' satisfaction (UT, 2015).

Components of the Program	Indicators
General Services	1. Distinct Information about UT.
	2. The students' tuition fee compared to the provided services.
	3. The ease of contacting UT Staff
	4. The ease of contacting the lecturers
	5. The hospitality of UT staff in serving students
	6. Efectiveness in handling complaint
Registration Services	7. Service of processing Registration file
	8. Service of payment in UT's partner banks
	9. Service of registration case settlement
Tutorial Services	11. Tutor's mastery of the Materials
	12. Tutor's role in helping students to understand the course materials.
	13. Tutor's feedback towards tasks and practices.
	14. Suitability of the tutorial activity and the schedule
	15. Quality of tutorial facility
	16. Ease of accessing the tutor
Practical Services	17. Instructor's mastery of the material
	18. Instructor' role in helping the implementation of practice / lab course
	19. Instructor's feedback during the practice/lab course.
	20. Ease of getting the practice/lab course schedule
	21. Suitability of the practice/lab course with the schedule
	22. Completeness of practical/ lab course equipment
Learning Material	23. Ease of accessing learning material
	24. Quickness in understanding the learning material
	25. Ease of understanding the learning materials
	26. Quality of the learning material's packaging
	27. Ease of using TBO application
	28. Avalaibility of learning material in the TBO
	29. Suitability of the given material and the ordered material
Examination Services	30. Ease of getting examination's information
	31. Availibity of the test script
	32. Discipline implementation of the exam
	33. Quality of the exam location's facility
	34. Quickness in scoring case settlement

This research was analyzed using the method of Importance-Performance Analysis which consists of two stages:

1. Searching for the Suitability Level

Suitability level is a comparative result of satisfaction score and expected the score. This satisfaction level would be determined the priority order of the service that was provided by Open University (UT). If the performance (perception) is under-expectation/importance, the customer will be disappointed and dissatisfied (Supranto, 2006).

2. Cartecius Diagram

Cartesius Diagram is an object divided into four parts and limited by two lines in perpendicular intersection in point (X,Y) in which X is the average value of customers' performance or satisfaction level of all factors or attributes, while Y is the average score of importance/ expectation level of all factors that affected the students' satisfaction. The Cartecius Diagram is divided into four quadrants.

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The diagram consists of four quadrants (Supranto, 2001):

Quadrant I (Concentrate Here)

This quadrant contains the statement that is considered to be important by the students, but in fact, the statement has not been suitable for the students' expectations. The performance level of the statement is lower than the students' expectation level of the statement. The statements contained in this quadrant should be further enhanced in order to satisfy the students.

Quadrant II (Maintain Quality)

This statement has high expectation and satisfaction level. It implies that the statement is important and has high performance. It must be maintained for the next time as it is considered to be very importance/expected and the result is satisfying.

**Quadrant III (Low Priority)**

The statement in this quadrant is considered to be less important by the students and in fact, the performance is common or not special

Quadrant IV (Possible Overkill)

The statement in this quadrant has low expectation level according to the students, even though it has good performance, so the students considered it to be excessive. They consider it is not important or less important although its implementation is done very well.

RESULT

The respondents of this research consisted of 485 people distributed over 35 of 40 UT Regional Offices (UT-ROs) in Indonesia; the distribution is in Graph 1. Distribution Percentage of the Respondents. Due to the online questionnaire, it was indicated that the respondents who answered were FKIP students who were in the city and able to access the internet. Therefore, based on the distribution of data, some respondents came from Java which was indicated to have better internet access than other regions.
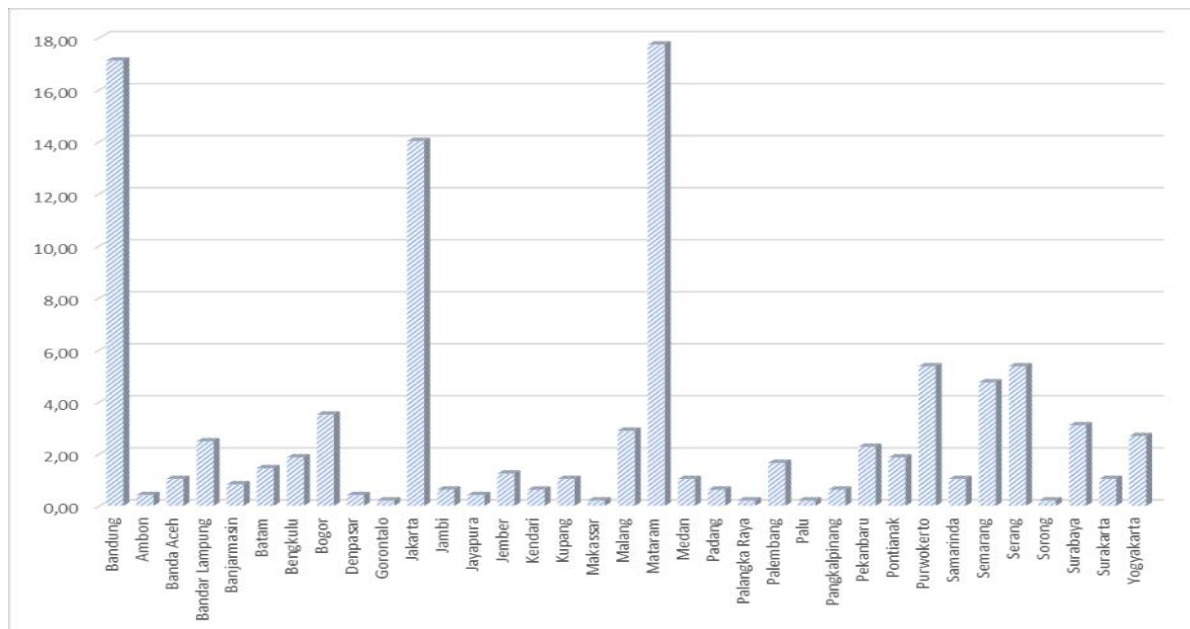

Graph 1. Distribution Percentage of the Respondents.

As explained in Research Method, the questionnaire was distributed by online on the official website of the faculty. All the students were welcomed to fill the questionnaire. Every study programs must socialize the filling procedures of the questionnaire. The percentage of respondents per study program is presented in "Graph 2. Distribution of Respondents of Study Program."

Besides, based on the obtained questionnaire, 30,7% were students of Primary Teacher Education (PGSD) study program, followed by Mathematics Education (PMAT) and Early Childhood Teacher Education (PGPAUD) got 25,2%, Physic Education (PFIS) got 10,5% and the rest study program got less than 5%.

One of the factors that affected the distribution of respondents was the number of students. PGSD and PGPAUD study program was the one with the highest number of students in UT. In addition, the socialization of the questionnaire from the study program became another factor affected the distribution of respondents.
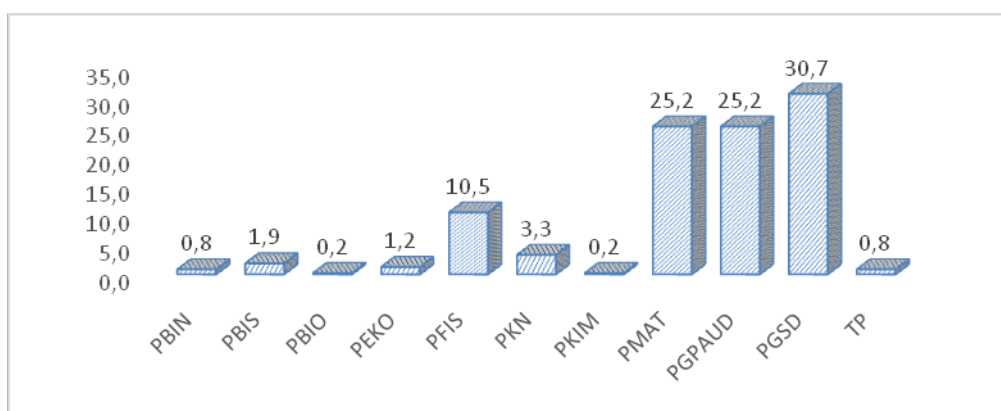
Graph 2. Distribution of Respondents of Study Program.

A. General Services

The General Services was services related to the general information provided by UT, but it did not include services of the study program. The following table is Table 2. The Result of Public Service Gap Analysis.

Table 2. The Gap Analysis Result of Public Services.

Aspects of Service	Importance	Satisfaction	Gap
A1. Distinct Information about UT.	3,38	3,50	0,12
A2. The students' tuition fee compared to the provided services.	3,33	3,42	0,09
A3. The ease of contacting UT Staff	3,29	3,41	0,12
A4. The ease of contacting the lecturers	3,12	3,19	0,07
A5. The Hospitality of UT staff in serving students	3,41	3,50	0,09
A6. Efectiveness in handling complaint	3,03	3,38	0,35

B. Registration Services

The information system used for academic administration service was an application called Student Record System (SRS). The SRS application was used to access students' database in the settlement of academic administration cases, such as students' registration case, students' scores that had not come out, or any other administration cases.

Table 3. The Gap Analysis Result of Regisration Services

Aspects of Service	Importance	Satisfaction	Gap
B7. Service of processing registration file	3,53	3,58	0,05
B8. Service of payment in UT's partner banks	3,50	3,60	0,10
B9. Service of registration case settlement	3,32	3,48	0,16

C. Tutorial Services

UT provided face-to-face and online tutorial. The following is the result of tutorial service gap analysis

Table 4. The Gap Analysis Result of Tutorial Service

Aspects of Serice	Importance	Satisfaction	Gap
C10. Tutor's mastery of the material	3,34	3,50	0,16
C11. Tutors' role in helping students to understand the course material	3,18	3,47	0,29
C12. Tutors' feedback toward assignment/ tasks	3,18	3,34	0,16
C13. The suitability of tutorial activity and the schedule	3,36	3,51	0,15
C14. The quality of tutorial facilities	3,20	3,30	0,09
C15. The Ease of acessing the tutor	3,42	3,58	0,16

D. Practical Services

UT provided practice/ practicum services which supported the practical course correspond to the curricullum. The following are the result of its services.

Table 5. The Gap Analysis Result of Practice/ Lab Course Services

Aspects of Service	Importance	Satisfaction	Gap
D16. Instructor's mastery of the material	3,44	3,48	0,05
D17. Instructor' role in helping the implementation of practice / lab work	3,39	3,48	0,08
D18. Instructor's feedback during the practice/practicum.	3,36	3,41	0,05
D19. Ease of getting the practice/lab work schedule	3,41	3,42	-0,01
D20. Suitability of the practice/lab course activity and the schedule	3,45	3,46	0,01
D21. Completeness of practice/lab work equipments	3,34	3,49	0,14

E. Material Services

In the long distance learning system, material was the main learning source for students. The UT's materials were specially designed for students to learn independently.

Table 6. The Gap Analysis Result of Material Services

E22. Ease of accessing learning material	3,34	3,58	0,24
E23. Quickness in understanding the learning material	3,17	3,42	0,24
E24. Ease of understanding the learning material	3,04	3,39	0,35
E25. Quality of the learning material's packaging	3,27	3,49	0,21
E26. Ease of using TBO application	3,41	3,47	0,05
E27. Availabiity of learning material in TBO	3,32	3,42	0,11
E28. Suitability of the given learning material and the ordered learning material	3,34	3,48	0,14

F. Exam Material Services

Table 7. The Gap Analysis Result of Exam Material Services

Aspects of Service	Importance	Satisfaction	Gap
F30. Ease of getting examination's information	3,66	3,71	0,05
F31. Availabiity of the test script	3,63	3,67	0,05
F32. Discipline implementation of the exam	3,57	3,59	0,02
F33. Quality of the exam location's facility	3,35	3,52	0,17
F34. Quickness in scoring case settlement	3,17	3,48	0,31

G. Quadrant Analysis of All Service Aspects

The quadrant analysis was used to know the consumers' response toward the plotted aspects based on importance and satisfaction level of each aspect.
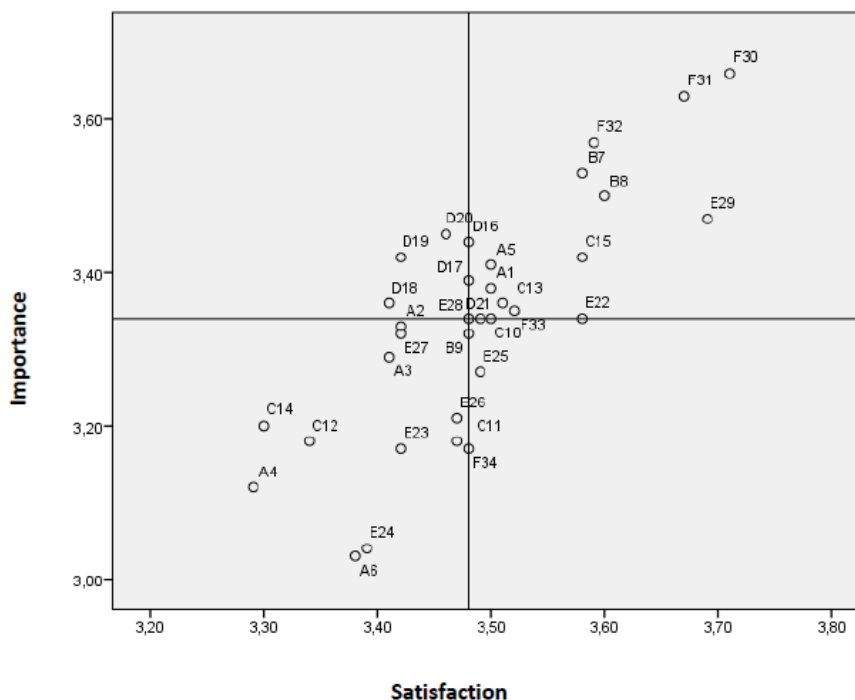

Figure 1. Quadrant Analysis of All Service Aspects

On quadrant I, there are service aspects: The students' tuition fee compared to the provided services.; Instructor' role in helping the implementation of practice/lab course; Instructor's feedback during the practice/lab course; Ease of getting practice/lab work schedule; Suitability of the practice activity and the schedule; Suitability of the received material and the ordered material; Quickness in scoring case settlement.

Distinct information about UT; Service of processing Registration file; Ease of getting examination's information; Availability of test script; Discipline implementation of the exam; Service of payment in UT's partner banks; Teaching material accepted before the first tutorial meeting; Ease of acessing the tutor; Ease of getting the learning material; The hospitality of UT staff in serving students; Suitability of the tutorial activity and the schedule; Quality of exam location's facility; Tutors' mastery of the material; Instructor's mastery of the material, are aspects of services that exist in the quadrant II.

In the quadrant III, there are aspects: The ease of contacting UT Staff;, Service of processing registration file; Availability of learning material in the TBO; Ease of accessing the tutor; Effectiveness in handling complaint; Tutor's feedback towards tasks and practices; Quality of tutorial facility; Quickness in understanding the learning material; Ease of understanding the learning materials; Ease of using TBO application. Whereas the quadrant IV consists of Tutor's role in helping students to understand the course materials and Quality of the learning material's packaging.

DISCUSSION

At the general service, "Easiness to contact tutors" was the service which got the lowest satisfaction result, that was 0.07 gap. This condition was understandable because UT was a long distance education, so for students who did not do the face-to-face tutorials, the students could not meet the tutor directly. For the students who attended the online tutorial, they were only able to communicate with the tutor through discussion and email. Therefore, the study program should coordinate the tutor to keep in touch with the students, so that all students' complaints about the material or other cases could be handled immediately. The highest gap result of these services was the "Speed of handling complaints" aspect. UT had provided several facilities that could be utilized by students. Students' complaints could be submitted through the UT page at http://www.ut.ac.id/, or consult with the lecturers at the UT-ROs. In addition, students could take advantage of UT contact center service. One of the respondents stated that "public service, I think is already good when I visited Central UT to manage the problem of program transfer, the related staff received it friendly and worked quickly. My problem was solved in one day at FKIP".

In the tutorial service aspect "The tutors' role in helping students to understand course materials" was the aspect that got the best results. The role of tutors in online tutorials and face-to-face tutorials was a facilitator in helping

students to understand the material. Tutors could discuss with students about the materials or solutions from the study cases. In addition, the tutor had attended a training which was suitable to his / her qualifications.

In a long distance learning system, the teaching materials were the main learning resource for the students. UT teaching materials were specially designed for a student to study independently. Related to the development of printed materials, currently, study program had worked with UT's outside lecturers. Broto (2016) stated that the Model of Instructional Design Development (MPI) that had been applied in UT in the BMP writing had met the requirement of the long-distance learning process. In its implementation, The Model of Instructional Design Development had met the standards of the approach system in instructional technology. Nevertheless, the aspect of teaching materials was an aspect that got low satisfaction value. Particularly the aspect of "easiness to understand the teaching materials", each study program should improve the quality of the teaching materials by conducting a learning resource evaluation, the tighter author selection, the equations of perception with authors, the more competent reviewer's selection and should revise the five-year-old modules soon.

Aside from the printed materials, UT also provided a Virtual Reading Space (RBV) which became difficult if there were no internet access because without internet students could not order the material and UT did not provide selling material service offline. This was in line with Lestari's (2016) research which states that some obstacles in accessing online teaching materials, such as the lack of students' information technology, the high cost of access, and time limitation

The discipline aspect of the examination discipline got the less satisfaction value and there were respondents stated that the implementation of the test was not satisfying. "In my location, as far as I have been experiencing, it is very bad. Some students do various ways to cheat. With these conditions, UT should make a better strategy, so that exam discipline and implementation could run well.

The quadrant analysis was used to determine the consumer response to the plotted aspects based on the level of importance and satisfaction of each aspect. Based on this quadrant analysis, it could be seen that the location of each variable was in a different quadrant, so the variables need to be improved and get more attention would be known.

There were seven aspects in the quadrant I. In this case, FKIP should improve its services especially related to practice/lab work service. For example about the readiness of supervisors. One of the supervisor's job was guiding students in tutorial class and/or guiding them through email. FKIP should work with local managers to provide socialization about supervisors' jobs on the briefing. The aspects related to material were the most common aspects in quadrant II. In this case, UT had been implementing good service of teaching materials. In Quadrant III there were seven aspects. While in quadrant IV, there was Tutors' role in helping the student to

understand the material, and Quality of material's packaging. Although in this service, the students considered it not so important but UT must improve its services.

CONCLUSIONS

The research showed 98% gap between importance and satisfaction was positive. The "Easiness to contact tutor" aspect was the general service aspect which got the lowest satisfaction, that was 0,07. The aspect of "Tutors' role in helping students to understand the material" was the aspect with the best result. This showed that tutors' role was very important related to the provided academic services and so was the practice/ practice services. Supervisors' readiness was important for students. Therefore, FKIP should cooperate with the local manager to give socialization about the supervisors' job during the practice/ practicum activity.

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