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Full Length Research Paper

Determinants of students' vulnerability to attrition in higher education: Evidence from Arba Minch University, Ethiopia

Fassil Eshetu*, Adem Guye, Getahun Kelemework and Sileshi Abebe

Department of Economics, College of Business and Economics, Arba Minch University, Ethiopia.

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This study aimed at assessing the level and determinants of students' vulnerability to attrition in Arba Minch University, Southern Ethiopia using a random sample of 547 students. The study revealed that, out of 547 sample students, 207 (38%) students were found highly vulnerable to attrition, 51 (9%) students were moderately vulnerable and the remaining 289 (53%) were not vulnerable. From highly vulnerable categories of students, 132 (64%) were female, while 75 (36%) were male students. With respect to place of origin, out of 207 highly vulnerable students, 119 (57%) of students were from rural areas where as 88 (43%) of students were from urban areas. In addition, 40% of students who were placed to a study program without their interest were highly vulnerable. The study also revealed that first year students are more likely vulnerable to attrition than second and third year students. Logistic regression result revealed that gender, students' satisfaction, study hours, monthly income and faculty of study significantly affect students' vulnerability to attrition. So, to reduce the number of unfinished degrees and reduce vulnerability to attrition, leaders of higher institution should give due attention to students' program placement, tutorials for female students and provision of better student services.

Key words: Attrition, vulnerability, logit model, higher education.

INTRODUCTION

Education is a development of physical, mental, moral (spiritual), and social faculties of individuals, for a life of dedicated service (Eshetu, 2002). It is a powerful tool to enable citizens to make all rounded participation in the development campaign (Tiruneh and Petros, 2014). It is important in raising the productivity of a nation and hence can be seen as vital components of growth and development (Todaro and Smith, 2012). Education is the means or the tool that any society has to possess for

confronting the current and future socio economic challenges, and indeed to shape our world of tomorrow (UNDP, 2007). Therefore, education is a prime objective of every one (Egenti and Omoruyi, 2011).

The relationship between education and economic development has been recognized in the literature. There are two important points in this regard. According to Gyimah-Brempong (2010) education is seen a product of development process on one hand. Education is a central

*Corresponding author. E-mail: bekattech@gmail.com.

place in accelerating the development of economies through knowledge, skills and attribute change. It affects economic growth, poverty and inequality reduction, health improvement, good governance, institutional development and policy framework (Muhdin, 2016) and (World Bank, 2008). Students are the most essential asset in any educational system. The students' performance plays an important role in producing the best quality graduates who will become great leader and manpower for the country thus responsible for country's economic and social development (Ali et al., 2009). The schools, colleges and universities are for purpose of enabling the students acquire necessary skills and knowledge to participate in the development process (Mushtaq and Khan, 2012) and (Horn, 2014). As estimated by Pascarella and Terenzini (2005) an increase in one letter grade was associated with an increase in earnings between 8 and 9%. Students with exceptionally poor academic performance may face academic probation, enrollment restrictions, or institutional expulsion (Horn, 2014).

The issue of academic performance has received a considerable attention in any academic programs (Mushtaq and Khan, 2012; Mutairi, 2011). In order to succeed students must place a certain value on academic achievement (Soule, 2009). Thus, due attention has been given for students' academic performance. However, measuring academic performance is a challenging aspect of literature (Mushtaq and Khan, 2012). Besides, factors determining the student's academic performance is vary from place to place (Ali et al., 2013), from person to person and from country to country (Mushtaq and Khan, 2012) and become one of a long standing and ongoing debate among educators, academics, and policy makers (Harb and Sharawi, 2006; Sarwar and Sarwar, 2012).

One of the greatest assets of a country is its youth; more educated youth can contribute more to the country (Zaheer et al., 2016). If youth are effective and successful in education, they can play a significant role to the development of science and technology of any nation (Gota, 2012). It is empirically proved that those who have a graduate degree can find job more easily than their non-graduate counterparts (Richard and Parker, 2012). This did not only enables them to earn for themselves but also prevent them from becoming a burden on nation's economy (Zaheer et al., 2016). However, recent evidences confirm that higher education institutions have given more attention towards attracting new students than retaining the already involved students (Zemke, 2000 cited in Zaheer et al., 2016) and this results high attrition and drop out of the students. As cited in Njoroge et al. (2015), Tinto (1975) has defined student attrition as the process of interactions between individual, academic and social systems of the university which determine whether students are retained or drop out. Attrition is considered as a departure from all forms of higher

education before completion of degree or other credential (Johnson, 2012). To Rilwani et al. (2014), attrition is the declining level of student retention in a given subject or course of study. According to Hussain and Khader (2014) student attrition is a flow out of the students from the institutions through course change, illness and so on. Attrition refers to the proportion in particular year that neither graduate nor continued studying the following year (Daniel, 2014) and it provides a measure of the proportions of students who drop out of institution each year (Rendon et al., 2000). Recently attrition rate is considered as a measure of quality of higher institutions in conjunction with the other measures (Daniel, 2014). Student attrition has upsetting and costly impacts (Hussain and Khader, 2014) and it has drawn a considerable attention globally and nationally in colleges and universities (Brockett, 2002) due to negative consequences it has on individual students' lives, their families and a country's economies (Njoroge et al., 2015). The result of attrition is a large number of unfinished degrees which have a cost for country, the students and the universities concerned, Schneider (2010), Rumberger and Lamb (2003) and Braunstein et al. (2006).

The causes of student attrition are multifaceted and include factors internal to the students and external factors in various environments including family and institutions (Njoroge et al., 2015). A number of studies have identified student's academic background and academic school experiences as a major determinants of student attrition (Hussain and Khader, 2014; Zaheer et al., 2016; Jiraneck, 2010; Daniel, 2014; Helen, 2010). Other studies considered personal problem, university environment and economic problems as factors for high attrition rate in academic institution (Yeshimebrat et al., 2009; Daniel, 2014). There are also studies suggesting parental support factors as the major determinants of student attrition (Islam, 2014; Njoroge et al., 2015).

Higher education is of paramount importance for development since it expands people's productive capacity as well as national capacity and competitiveness (Ademe and Singh, 2015). Evidences revealed that higher education enrollment statistics in Ethiopia has been growing from time to time due to strong emphasis of the government on the sector. Moreover, the government has been striving to ensure that some disadvantaged members of the society get access to higher education institutions (Tsehaye and Yesuf, 2013). In addition due to formulation of national policy for Ethiopian women in 1993 (TGE, 1994 cited in Helen, 2010) and permission to enter higher education with lower score than required for male (Beyou, 2003 cited in Helen, 2010) number of females entering higher education institutions are dramatically increasing from time to time. However, none is more serious and persistence than poor academic achievement and subsequent academic dismissal of students especially first year students in Ethiopian higher institutions (Gota, 2012). Dropout rate in Ethiopian

universities was between 10 and 15%, Yalew (2003), Gota (2012), (Semela, 2007) and (Fentaw, 2001 cited in Gota, 2012). Disaggregated studies by gender revealed that higher attrition rate is observed for female students than male students in Ethiopian universities, Yeshimebrat et al. (2009) and Semela (2007).

There are various literatures which examine the determinants of students' academic performance at higher institutions. According to Bean (1980), socio-economic factors, students backgrounds, place of residences (rural-urban), organizational factors, opportunity costs of study and staff-student relationship are important in affecting students' academic performance. Tinto (1975) argued that academic and social integration are important factors against student attrition at university. Moreover, studies by Johnson (2008), Hoffman et al. (2002), Willcoxson et al. (2011) and Leveson et al., (2013) revealed that aside from academic and social integration, attrition has also been shown to be linked to prior academic performance, engagement with faculty and students, financial problem and lack of commitment to study.

Willcoxson et al. (2011) also noted that attrition in the first year of study could result from different reasons as compared to attrition in later years of study. Specifically, Willcoxson et al. (2011) noted that personal factors, such as the lack of academic or social integration are more influential in first year attrition, while institutional factors, such as teaching quality and staff-student interactions are more crucial in determining attrition in later years. Another important finding from Willcoxson et al. (2011) study is the strong association between first year students' expectation of the institution and intention to leave. Hence, first year students were found to be sensitive to factors such as the availability and approachability of teaching staff and empathy shown. In the second and third year, academic confidence appears to be of paramount consideration in students' intention to leave their studies.

Regarding the link between students' satisfaction and their academic performance, Yorke (2000) and Pike (1991) pointed that, students' satisfaction measures as a predictor of academic performance as measured by grades or marks. They found that satisfaction exerts strong influences over grades rather than the other way around. In the relatively few studies that examine the influence of student satisfaction on grades or academic performance, findings that more satisfied students perform better in their grades are common (Grayson, 2004).

Survey of previous studies shows that there are some studies focused on attrition and its determinants in higher education institutions using descriptive analysis (Njoroge et al., 2015; Daniel, 2014; Wudu and Getahun, 2009; Yeshimebrat et al., 2009; Helen, 2010; Zaheer et al., 2016; Roque et al., 2013; Tiruneh and Petros (2014); Griswold, 2014; Fowler, 2016; Rilwani et al., 2014;

Brockett, 2002; Ishitani, 2006; Hannah, 2010; Willging and Johnson, 2004; Fisher and Engmann, 2009; Hussain and Khader, 2014; Geisinger and Raman, 2013; Rodan, 2001; Harvey and Luckman, 2014; Tsehaye and Yesuf, 2013). Most of these studies took a sample of already dropped, dismissed or re-admitted students to achieve their objectives. Answering such question is partially beneficial when concerned with controlling student attrition. The problem is that even if students are not currently dropped, dismissed or re-admitted, they may have high probability of being so in future academic year, a new forward looking concept. Put differently there are some students who are at risk of or endanger of being dropped out of institution due to academic failure even if they are survived in the current semester. These students are said to be vulnerable to academic attrition. Focusing on vulnerability of students to attrition is highly beneficial because it helps minimize the likelihood that a student will be dropped in future academic year through intervention mechanisms. Such critical issue had never been given attention in any of the previous studies. Motivated by this, the present study aimed at examining empirically the phenomenon of vulnerability of student to attrition and its determinants at Arba Minch University using Econometric analysis.

Arba Minch University is one of the 33 Public Universities in Ethiopia established to contribute to the development of the nation and scientific knowledge creation in the world. Since its inception, this university has shown upward trends in all spheres of activities. So, the main objective of the present study is to examine the determinants of Students' vulnerability to attrition in Arba Minch University. Specifically the study was devoted to:

- (i) Measure students' level/degree of vulnerability to attrition at higher institution
- (ii) Identify the level of students' vulnerability to attrition by gender, place of origin, program placement, batches and faculty
- (iii) Examine the determinants of students vulnerability to attrition at higher institution

METHODOLOGY

Description of study areas

Arba Minch University (AMU) is one of the state-owned Universities found in the Southern Nations, Nationalities and People's Region (SNNPR). It is located at Arba Minch town, 500 km south of Addis Ababa. The main campus of the university is situated at the eastern foot of Gamo mountain ranges and adjacent to the vast low land stretching towards Lake Abaya and Lake Chamo, which form part of the East African Rift Valley. The University was established in June 2004 in the premises of the former Arba Minch Water Technology Institute (AWTI), which was established in 1986 with the objective of producing trained professionals in the field of water resources.

The University has a total of 31870 undergraduate, 2160 second degree and 24 PhD students in all its programs and campuses,

(Arba Minch University report, 2016). This makes the total number of students 34,054 attending their education in regular, summer, weekend/evening and distance education modes. The university is functioning in six campus premises and is offering 69 undergraduate and 82 postgraduate (73 masters 9 PhD) program in 52 departments. The present study is conducted at Chamo Campus of Arba Minch University by taking two collages (College of Business and Economics and College of Social Sciences and Humanities) and two Schools (School of Law and School of Pedagogical and Behavioral Science). According to Arba Minch University report in 2016 G. C, there were a total of 3784 under graduate regular students majoring in different fields of the study in two colleges and two schools. The data for the present study depends on primary and secondary sources. The primary data includes information about student satisfaction from the various services provided by the Campus such as teaching and learning related services, cafeteria, dormitories, class rooms, campus administration, library and ICT and clinic related services. It was collected using five point liker scale questionnaire ranging from strongly disagree (1) to strongly agree (5). But, secondary data concerning students CGPA and attrition was collected from registrar office of the Campus.

Sampling techniques and sample size determination

The participants of the study were chosen from two colleges and two schools in Chamo campus namely, college of business and economics, college of social science, school of law and school of pedagogical and behavioral science. To insure representativeness, total samples of 547 students were selected using proportionate sampling techniques. Accordingly a sample of 337 students were taken from college of Business and Economics while 210 students were selected from Colleges of Social sciences and Humanities, school of law and school of pedagogical and behavioral science. Finally, sample respondents were randomly selected from nine departments.

Empirical model specification

This study aimed at examining the determinants of vulnerability of student to attrition. Previous related studies focused on the determinants of student's attrition and they relied on descriptive analysis. In this study student vulnerability to attrition is defined as the probability being dismissed or re-admitted in future. It is the ex-ante risk that a student that is currently retained will be re-admitted or dismissed. The assessment of vulnerability is helpful in that it determines those students who are in danger of being readmitted or dismissed and factors affecting this risk. First high performing and low performing students will be grouped based on agreed cut off-point. Accordingly the agreed cut-off point or threshold grade is 2.49. This is because it is highly likely that students having CGPA of less than or equal to 2.49 may be at risk of being readmitted or dismissed from the university. A sampled students were divided into two, high performer and low performer. A dummy dependent variable is generated by giving 1 for low performing student and 0 for high performing student. Then logistic model is estimated to determine the determinants of student's academic performance.

$$\ln \left(\frac{\Pr(Y_i \leq 2.49)}{\Pr(Y_i > 2.49)} \right) = \ln \left(\frac{P}{1-P} \right) = Z_i \quad (1)$$

The ultimate outcome of our calculations is a set of estimates V_i of the probability that each student will be dismissed or re admitted in future. The estimate of vulnerability for each student takes values in the interval [0, 1]. At the extremes the estimate of V_i can be 0 and 1.

When $V_i = 0$, student will retain in university in future with certainty until graduation; when $V_i = 1$, student will be dismissed or re admitted in future. Since we can attach an index V_i to all students, the question arises which students are considered as vulnerable to attrition in between two extremes. This is particularly important for designing any mitigating interventions so as to reduce the attrition of students. It makes sense to consider students with estimated vulnerability close or equal to unity as "Vulnerable" and those with a vulnerability index close or equal to zero as "non-vulnerable". But as we move towards center of spectrum, the distinction becomes less obvious and the need for arbitrary cut-off point arises. Among many choices of cut-off points, the most commonly used one is 0.5. Finally, the present study estimated the determinants of student vulnerability to attrition by giving 1 for students with $V_i \geq 0.5$ and 0 for students with $V_i < 0.5$ using logistic regression model.

$$\text{Vulnerability} = X'\beta \quad (2)$$

Since the dependent variable is dichotomous, this model can be estimated using maximum likelihood estimation and the logistic regression can be specified as follow:

$$L_i = \beta_0 + \beta_1 \text{AGE} + \beta_2 \text{MALE} + \beta_3 \text{HRS} + \beta_4 \text{INCOME} + \beta_5 \text{PLACE} + \beta_6 \text{SECOND} + \beta_7 \text{THIRD} + \beta_8 \text{PROGRAM} + \beta_9 \text{SAT} + \beta_{10} \text{COLLEGE} + U_i \quad (3)$$

Where L_i , AGE, MALE, HRS, INCOME, PLACE, SECOND, THIRD, PROGRAM, SAT and COLLEGE refer to Logit, age of students, gender of students, daily hours of study, monthly income from family, place of origin (rural and urban), dummy for second year students, dummy for third year students, dummy for program placement (by interest and without interest), general satisfaction of students and dummy for college of students respectively.

The dependent variable (L_i) is a nominal binary variable which assumes values of 1 for students with probability of greater than or equal to 0.5 and 0 value for students with probability of less than 0.5. Dummy for place assumes 1 for students from urban origin and 0 for students from rural origin. Similarly, dummy for program placement assumes 1 for students who were placed by their interest and 0 for students who were placed without tier interest. Finally, dummy for college assumes 1 for students from college of business and economics and 0 otherwise.

RESULTS AND DISCUSSION

This section presents the various results obtained from both descriptive and econometric analysis. The analysis was based on the primary data obtained from 527 students and secondary data obtained from registrar office.

Descriptive data analysis

As indicated in methodology part, secondary data on cumulative grade point average (CGPA) of all students in Chamo campus were collected from registrar office of college of business and Economics and registrar office of college of Social Science so as to determine appropriate sample size. The main objective of this study was to examine the determinants of students' vulnerability to attrition in Chamo campus and in this study, the

Table 1. The distribution of cumulative grade point average by batch of students.

Cumulative GPA of students	Batch of students						Total	
	First year		Second year		Third year		No	%
	No	%	No	%	No	%		
CGPA<=2	41	18.3	7	5	5	2.73	53	9.69
2<CGPA<=2.49	44	19.64	45	32.14	59	32.24	148	27.06
2.49<CGPA<=3.99	59	26.34	38	27.14	60	32.78	157	28.7
CGPA>=3	80	35.71	50	35.71	59	32.24	189	34.55
Total	224	100	140	100	183	100	547	100

Source: Own Survey, 2017.

Table 2. The distribution of cumulative grade point average by sex of students.

Cumulative GPA	Sex				Total	
	Female		Male		Number	%
	Number	%	Number	%		
CGPA<=2.00	25	13	28	8	53	10
2.00<CGPA<=2.49	81	41	67	19	148	27
2.49<CGPA<=3.99	50	25	107	31	157	29
CGPA>=3.00	41	21	148	42	189	35
Total	197	100	350	100	547	100

Source: Own Survey, 2017.

researchers defined students with CGPA of less than or equal to 2.49 as low performing student or vulnerable to attrition. As evidenced in Table 1, about 36.75% of the total sample students in Chamo campus have CGPA of less than or equal to 2.49 and therefore, they are vulnerable to attrition. Moreover, about 9.69% of the total sample students in Chamo Campus have CGPA of less than 2.00 and they are first year students. As noted in Table 1, from the total sample students in this study, 34.55% of students have CGPA of greater than or equal 3.00 while 28.70% of students have CGPA between 2.49 and 3.00. This study also tried to see vulnerability by years of stay in the campus and gender using survey data on cumulative GPA of students.

Table 1 revealed that first year students are more likely to be vulnerable to attrition than second year students and second year students are also more likely to be vulnerable to attrition compared to third year students. From a total sample of students, 224, 140 and 183 students were selected from first year, second year and third year students. The result implies that vulnerability to attrition decreases as years of stay in the campus increases. This study showed that 18.30% of first year students scored less than or equal to 2.00 points out of 4.00 points while 5 and 2.73% of second year and third year students scored less than or equal to 2.00 points respectively. By implication, as experience increases, students' vulnerability to attrition decreases.

This study also compared the performance of sample students by gender as presented in Table 2. In this study, from a total of 547 sample students, 197 (36%) students were female while 350 (64%) were male students. Data on cumulative GPA of sample students were categorized in to four categories as shown in Table 2. Accordingly, from a total of 197 female students, 25 (13%) of them scored a cumulative GPA of less than or equal to 2.00 whereas from a total of 350 male students, 28 (8%) of them scored a cumulative GPA of less than or equal to 2.00. Similarly, a cumulative GPA of 41 and 19% of female and male students respectively found between 2.00 and 2.50 point. The result revealed that female students are more vulnerable to attrition compared to male students in Chamo Campus. According to student integration model, the basic factors which affect student attrition includes student characteristics and program characteristics, Tinto (1975). According to Hirschy et al. (2011), race, ethnicity, gender, age, parental education level, ability to pay, and domestic partner status can affect student's attrition. So, colleges/ School leaders should properly manage female student's tutorials so as to raise their performance and reduce their vulnerability to attrition. Finally, the study also compared the performance of students by college of students and the result was presented in Table 3.

As noted from Table 3, from a total 547 students, 189 students scored a cumulative GPA between 3.00 and

Table 3. The distribution of cumulative grade point average by faculty of students.

Cumulative GPA	College of Students				Total	
	Social Science and Humanity ^a		Business and Economics			
	Number	%	Number	%	Number	%
CGPA≤2	15	7	38	11	53	10
2<CGPA≤2.49	49	23	99	29	148	27
2.49<CGPA≤3.99	54	26	103	31	157	29
CGPA>=3	92	44	97	29	189	35
Total	210	100	337	100	547	100

Source: Own Survey, 2017. ^aCollege of Social Science and Humanity also includes School of Law and School of Pedagogical and Behavioral Science.

4.00. From a total 210 sample students from college of social science and humanity, 92 (44%) of them scored a cumulative GPA of 3.00 and above whereas from a total 337 sample students from college of business and economics, 97 (29%) of them scored a cumulative GPA of 3.00 and above.

By contrary, from a total sample students from college of social science and humanity, 15 (7%) of them scored a cumulative GPA of less than or equal to 2.00 while from a total sample students from college of business and economics, 38 (11%) of them scored a cumulative GPA of less than or equal to 2.00. Characteristics of a program such as its resources, facilities, structural/organizational arrangements, and its members that can limit or facilitate the development and integration of individuals within the institution or program can affect student's attrition and attrition is often the result of the interaction between student and program characteristics (Tinto, 1975). That is, student integration into the program, from an academic and social perspective, is often needed to achieve student success (Dodge et al., 2009; Tinto, 1975; Wells, 2003; Wells, 2007 and Pascarella and Terenzini, 1977).

According to Wells (2007) and Dodge et al. (2009), students frequently find that their expectations of what a program will entail do not match up with what they actually experience once in the program and this type of disillusionment has been found to be a contributing factor to student attrition and students that believe that they have made the right program choice tend to have higher levels of motivation which is, in turn, lead to lower attrition rate.

In the study area, most students joined business and Economics College by assuming there is no quantitative courses and when they actually joined the program, they may found a mismatch between their expectation and what is on the ground. Moreover, staff experience is higher in college of social science and humanities compared to business and Economics College. This is because, there is higher staff turnover in college of business and economics due to better job opportunities in other sectors of economy for them. All these, may account for higher students' attrition at college of business

and economics compared to college of social science and humanities.

In addition, from a total 210 sample students from college of social science and humanity, 64 (30%) of them scored a cumulative GPA of less than or equal to 2.49 while from a total 337 sample students from college of business and economics, 137 (41%) of them scored a cumulative GPA of less than or equal to 2.49.

Logistic regression

To classify the students in Chamo campus as highly vulnerable, moderately vulnerable and not vulnerable to attrition depending on the predicted probability of being dismissed or re-admitted in the future, two vulnerability thresholds were used following Chaudhuri et al. (2002). These two thresholds are the average vulnerability which is equal to the percentage of students whose CGPA is less than or equal 2.49 from the total sample students (0.3565) and 0.5. By using these two thresholds, sample students were classified as highly vulnerable if the predicted probability of being dismissed or re-admitted in the future is greater than 0.5, less vulnerable if the predicted probability of being dismissed or re-admitted in the future is between the average vulnerability (0.3565) and 0.5 and not vulnerable if the predicted probability of being dismissed or re-admitted in the future is less than the average vulnerability (0.3565).

Table 4 revealed that from a total of 337 sample students of college of business and economics, 142 (42.34%) students were highly vulnerable to attrition while from a total of 210 sample students of college of social science, school of law and school of pedagogical science, only 65 (30.95%) of students were highly vulnerable to attrition. That means, from the total 547 sample of students, 207 students are highly vulnerable to attrition. But, from these highly vulnerable students, 132 (64%) were female students while 75 (36%) were male students. This implies that, female students were more vulnerable to attrition in Chamo Campus compared to their male counterpart. From the total of 207 highly

Table 4. Students' vulnerability to attrition by sex, place of origin and program choice.

Variable		Non-vulnerable (289)	Moderately Vulnerable (51)	Highly Vulnerable (207)	Total
		$V \leq 0.3565$	$0.3565 < V < 0.50$	$V \geq 0.50$	
SEX	Male	240	35	75	350
	Female	49	16	132	197
PLACE	Urban	112	17	88	217
	Rural	177	34	119	330
PROGRAM	Interest	232	40	161	433
	Without Interest	57	11	46	114
COLLEGE	CBE	159	36	142	337
	Social	130	15	65	210

Source: Own Survey, 2017.

vulnerable students, 119 (57%) of students were from rural areas where as 88 (43%) of students were from urban areas. So, students with rural origin are more vulnerable to attrition than students from urban origin.

Regarding program placement 114 (21%) students responded that they were placed to a program or department without their interest and of these, 46 (40%) students were highly vulnerable to attrition. But, from 433 students who were placed to a program by their interest and 161 (37%) of students are highly vulnerable to attrition. Thus, students who were placed to departments without their interest are more vulnerable to attrition as evidenced by this study. From the total of 547 students, 289 (53%) of students are not vulnerable, 51 (9%) students are moderately vulnerable and 207 (38%) of students are highly vulnerable to attrition. Students with rural origin, female students, students who were placed to program without their interest and students from college of business and economics are more vulnerable to attrition in Chamo Campus.

In the first semester of 2009 E. C, from a total of 547 students there were 195 (35.65%) students whose cumulative GPA was less than or equal to 2.49. But, analysis of vulnerability revealed that 207 students are vulnerable to attrition or have high probability of getting cumulative GPA of less than 2.49. This means, 12 (2.2%) students were not vulnerable in the first semester of 2009 E.C, but they are vulnerable to attrition in the second semester of 2009 E. C. Therefore, vulnerability analysis is very important for forward looking policy targeting than mere dependence on the ex-post attrition measure. As the study revealed, the proportion of vulnerable students 207 (38%) is greater than the proportion of currently low performing students ¹195(35.65%).

¹ Low performing students are those students whose cumulative GPA is less than or equal to 2.49.

Econometric data analysis

To examine the possible determinants of students' vulnerability to attrition, the vulnerability index is used to categorize students as highly vulnerable and low vulnerable. That means, if the vulnerability to attrition is greater or equal to 0.5, the students is categorized as high vulnerable which takes the value of 1 and 0 if the vulnerability index is less than 0.5 for the students. Then, this dummy variable is regressed on all explanatory variables of the model to determine the relative strength of each variable in affecting vulnerability (the probability of being dismissed or re-admitted) using the logistic estimation. Vulnerability analysis has a paramount importance in identifying not only the currently poor performing students, but also those students who are more likely to be dismissed or re-admitted in the near future. Thus, this study classified students in to highly vulnerable and less vulnerable using thresholds of 0.5 and examined the determinants of vulnerability of students to attrition in Chamo Campus using logistic regression. The dependent variable is a dummy variable which is obtained from the vulnerability level of each student. The dependent variable assumes value of 1 if the students' level of vulnerability to poverty is greater than or equal to 0.5 and 0 if the students level of vulnerability is less than 0.5. The logistic regression result of the determinants of vulnerability of students to attrition is presented in Table 5 Below. The dummy dependent variable regressed on all age, hours of study per week, monthly income from family, overall satisfaction of students from various services, dummy for sex, dummy program placement, dummy for batch of students and college of students. Accordingly the determinants of students' vulnerability to attrition measured using logistic regression model and the result is presented in Table 5. The coefficients of Logit model showed that students' vulnerability to attrition is statistically significantly affected

Table 5. Logistic Regression of the determinants of students' vulnerability to attrition.

		Number of Observation = 547		
Log Likelihood		LR χ^2 (10) =175.72		
		Prob> χ^2 =0.0000		
		Pseudo R ² = 0.2466		
Variables	Coefficients	Standard Error	Z	Probabilities
Age	-0.0401	0.0749	-0.54	0.592
Sex	-1.0073	0.2341	-4.30	0.000
Income	-0.0013	0.0006	-2.20	0.028
Place	-0.2275	0.2245	-1.01	0.311
Program	-0.2626	0.2701	-0.97	0.331
Second	-0.1117	0.2690	-0.42	0.678
Third	-0.2831	0.2984	-0.95	0.343
Satisfaction	-0.3941	0.1613	-2.44	0.015
Hours	-0.4187	0.0485	-8.63	0.000
College	0.8112	0.2409	3.37	0.001
Constant	1.9763	1.6233	1.22	0.223
Link test	$Vulnerability = 0.0095 + 0.9858\hat{y} - 0.0110\hat{y}^2$			
	Z_value	= (0.08)	(7.93)	(-0.18)
	Variance Inflating Factor (VIF)	1.20		
	Average students' vulnerability to attrition	0.3565		

Source: Own Survey, 2017.

Table 6. Marginal Effect after Logistic regression of Students' vulnerability to attrition.

Variables	Marginal Effect	Standard Error	Z	Probability
AGE	-0.0081	0.0150	-0.54	0.591
SEX	-0.2119	0.0503	-4.21	0.000
INCOME	-0.0003	0.0001	-2.24	0.025
PLACE	-0.0452	0.0440	-1.03	0.305
PROGRAM	-0.0544	0.0567	-0.94	0.345
SECOND	-0.0221	0.0526	-0.42	0.674
THIRD	-0.0556	0.0573	-0.97	0.331
SATISFACTION	-0.0792	0.0325	-2.44	0.015
HOURS	-0.0841	0.0087	-9.64	0.000
COLLEGE	0.1553	0.0432	3.59	0.000

Source: Own Survey, 2017.

by gender, income, hours of study, general satisfaction and faculty of study. As indicated in Table 5, sex negatively and statistically significantly affects students' vulnerability to attrition at 1% level of significance. In other words, female students are more vulnerable to attrition. This study also revealed that second year and third year students are more vulnerable to attrition compared to third year students though statistically insignificant.

Regarding the relationship between students' satisfaction and vulnerability to attrition, the result from Table 6, revealed that higher students' satisfaction is

associated with lower students' vulnerability to attrition. So, satisfaction of students from various services in university may positively affect their academic performance. Study by Zoran (2016), Muhammad (2015) and Nara (2014) confirmed that student's satisfaction with University services affect student performance positively. It is believed that the relationship between students' vulnerability and monthly income from family is positive because money can buy you all the comforts that you need to concentrate on your studies, Radner et al. (1975), Bennett (2003), Jackson (1978) and Wells (2007). The result of this study revealed that students

belonging to more affluent family are less vulnerable to attrition as the coefficient of income from family is negative and statistically significant at 1% level of significance. Using data from a sample of 547 students, the results in Table 5 suggest that longer hours of study per week is associated with lower vulnerability of students to attrition.

As shown in Table 6, the probability of being highly vulnerable to attrition of male students is less than that of female students by 21.19%. Hence, female students have more vulnerability to future attrition than male students. According to studies conducted by Mersha (2009), Astin (1993), Prince, (1993), Egenti and Omoruyi (2011) and Eshetu (2002), as the grade level in higher institution increases, the number of female students starts to decline because of lots of factors and consequently, higher education remains an area of learning from which women are less represented. The very few women that are fortunate enough to join higher institutions are characterized by lower academic performance and higher forced withdrawal.

The coefficient of monthly income from family has negative sign and statistically significant at 5% level of significant. In other words, higher monthly income from family reduces vulnerability of students to attrition as presented in Table 6. Though statistically insignificant, students with urban origin were less vulnerable to attrition compared to students with rural origin. The studies conducted by Li et al. (2015), Lim (2015) and Coates and Edwards (2009) found that despite the rapid rise in participation of students from disadvantaged areas in higher education in recent years, their degree completion rates still lag behind those of their fellow students from more privileged or urban areas. More importantly, the overall satisfaction of student from the various services has negative and statistically significant effect on students' vulnerability to attrition. Studies conducted by Grayson (2004), Bean and Bradley (1986) and Pike (1991) found that there are strong association between students satisfaction from the various services provided in higher institutions and the academic performance of students. That means, most of the study revealed that more satisfied students perform better in their grades.

By implication, higher satisfaction from various services in university increases student retention and reduces students' vulnerability to attrition. So, raising the standard of services provision may raise students' satisfaction and thereby, reduce students' vulnerability to attrition in University.

Regarding the coefficient of hours of study per week, it affects students' vulnerability to attrition negatively and significantly. This implies that as hours of study per week increases by one hour, student's vulnerability to attrition decreases by 8.41% as indicated in Table 6. So, students' effort or commitment or determination has a paramount important in improving their performance and thereby reduce their vulnerability to attrition.

As noted in Table 6, faculty of students has significant effect on students' vulnerability to attrition. Dummy for college is defined as 1 for students from college of business and economics and 0 other wise. The coefficient of college dummy is positive and statistically significant at 1% level of significant. That means, vulnerability to attrition for students from college of business and economics is higher than the vulnerability of students from college of social science and humanity, school of law and school of pedagogical and behavioral science by 15.53%. In other words, students from college of business and economics are more vulnerable to attrition compared students from other college and schools. This difference in vulnerability may be due to the differences in experiences of staff, staff to student ratio and nature of the disciplines. This result is in line with the studies conducted by Cardak and Vecchi (2013) and Marks (2010) which classified the determinants of students vulnerability to attrition at higher institutions in to personal characteristics, prior academic performance and university characteristics (field of study and academic support programs). Finally, the diagnostic test results of the Logit model shows that there is no problem of Multicollinearity as the mean value of variance inflating factor (VIF) is 1.20 which is less than 10. The link test which can be used to check the existence of model miss-specification revealed that there is no problem of model miss-specification as the coefficient of \hat{y} is statistically significant.

CONCLUSION AND RECOMMENDATIONS

Students are the most essential asset in any educational system. The overall economic development of a country depends on academic performances of the students. The students' performance plays an important role in producing the best quality graduates who will become great leader and manpower for the country thus responsible for country's economic and social development.

This study aimed at assessing the level and determinants of students' vulnerability to attrition at Arba Minch University, Southern Ethiopia using survey data from a sample of randomly drawn 547 students. The study found that students' vulnerability to attrition decreases with an increase in their experience in the Campus. That means, first year students are more likely to be vulnerable to attrition than second year and third year students. With regard to students GPA 25 (13%) of female sample students and 28 (8%) of male sample students scored a cumulative GPA of less than or equal to 2.00. So, female students are more vulnerable to attrition compared to male students in Chamo Campus.

This study also revealed that from a total of 337 sample students from college of business and economics, 142 (42.34%) of students are highly vulnerable to attrition

while from a total of 210 sample students from college of social science, school of law and school of pedagogical science, only 65 (30.095%) of students are highly vulnerable to attrition. That means, from the total 547 sample of students, 207 students are highly vulnerable to attrition. But, from these highly vulnerable students 132 (64%) are female students while 75 (36%) are male students. This implies that, female students are more vulnerable to attrition in Chamo Campus compared to their male counterpart. As indicated in this paper, students with rural origin are more vulnerable to attrition than students from urban origin. Similarly, students who were placed to departments without their interest are more vulnerable to attrition as evidenced by this study.

In this study, out of 547 sample students, 289 (53%) of them are not vulnerable, 51 (9%) students are moderately vulnerable and 207 (38%) of students are highly vulnerable to attrition. Regarding the determinants of students' vulnerability to attrition, coefficient of sex is negative and statistically significant at 1% level of significance and this implies that male students were less vulnerable than female students. More importantly, the general satisfaction of student from the various services, hours of study per week, monthly income from family are negatively and statistically significantly affect students' vulnerability to attrition. Higher hours of study per week will raise students' confidence and lead to better performance. So, students' effort or commitment or determination has a paramount important in improving their performance and thereby reduce their vulnerability to attrition. The coefficient of college dummy is positive and statistically significant at 1% level of significant. That means vulnerability to attrition for students from college of business and economics is higher than the vulnerability of students from other college/schools by 15.53%.

Based on key results of the study, the researchers identified some areas for interventions in order to reduce the number of unfinished degrees (attrition) and increase the quality of graduates. The study found that female students are relatively more vulnerable to attrition and therefore, there is a need to provide tutorials classes for female and less performing male students. There is higher staff turn-over in college of business and economics and this leads to lower staff to student ratio and thereby, greater staff work overload. Due to this, course instructor may not have enough time to give tutorial for female and low performing male students. So, it would be better if tutorials for female and low performing students will be given by students with better cumulative GPA and assistant graduates. This study found that those students who were placed to program/department without their interest were more vulnerable to attrition than students who were placed by their interest. So, college/ school leaders have to give due attention to students' program placement and reduce the number of students who will be assigned to program without their interest.

According to Central Statistical Authority (2014), about 22% of the total population in Ethiopia is living below poverty line and therefore, it would be common to see students with financial problem in universities. Since this study revealed significant effect of monthly income from family on students' vulnerability to attrition, colleges/schools have to devise methods so as to help students with financial problem and thereby, reduce their vulnerability to attrition. Colleges/ schools have to work hard so as to improve staff to student ratio as this definitely affect students' academic performance. Motivating and cultivating the reading habit of students through availing up to date books, advising, giving routine exercises, allowing them to celebrate reading day at university level and the like have paramount importance to reduce students' vulnerability to attrition in higher institution. As indicated in this study, students' level of satisfaction from the various services in university reduces students' vulnerability to attrition. So, improving the standard of service provisions in higher institution may increase students' motivation, aspiration, and academic performance and thereby, reduce the number of unfinished degrees/vulnerability to attrition.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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Full Length Research Paper

Assessment of information and communication technology (ICT) competence and literacy skills among undergraduates as a determinant factor of academic achievement

Nwosu J. C.^{1*}, John H. C.², Izang A. A.³ and Akorede O. J.⁴

¹Department of Educational Foundations, School of Education and Humanities, Babcock University, Ogun State, Nigeria.

²Department of Educational Foundations and Instructional Technology, College of Specialized and Professional Education, Tai Solarin University of Education, Ogun State, Nigeria.

³Department of Computer Science and Information Technology, School of Computing and Engineering Sciences, Babcock University, Ogun State, Nigeria.

⁴Department of Educational Foundations and Instructional Technology, College of Specialized and Professional Education, Tai Solarin University of Education, Ogun State, Nigeria.

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Almost every human endeavor is supported or driven by Information and Communication Technology (ICT) including education. Teaching, learning, assessment, course registration, payment among other things are now ICT-based. Humans have attempted to use technology to improve their life span and quality, and education is not exempted in this great paradigm shift. This paper focuses on the Information and Communication Technology competence and literacy skills of undergraduate students in Ogun State, using their information literacy skills/competence as determinants of their academic achievement. A descriptive survey design was adopted for this study. The population of the study consists of 10,713 students from Tai Solarin University of Education (TASUED) comprising 4 colleges and 10,000 students of Babcock University comprising 9 colleges. Simple random sampling was used for the selection of a sample of 170 respondents from Babcock University and 130 respondents from TASUED. Three hundred students (from 100-500 levels) were the sample of the study. Well-structured questionnaire was the main instrument used for the collection of primary data. The findings of this study show that 80% of the undergraduate students of TASUED and BU have basic ICT literacy skills which entail the ability to source for and access information resources for their research. Furthermore, this study has proved that the use of ICT has improved students' academic performance. Recommendations were made based on the findings from the study.

Key words: Information literacy, academic achievement, undergraduates, higher education, Information and Communication Technology (ICT).

INTRODUCTION

In the last decades, with fast improving computing technology, there has been a change in the way we live.

This tremendous technological change is now affecting all manufacturing and service firms, including teaching and learning. Higher education plays a very important role through its graduates who occupy leadership positions in education as researchers, teachers, consultants and managers. Graduates of higher education are saddled with the responsibility to create and apply new knowledge and innovations. They also provide analytical perspectives on the problems of development and services rendered to the public and private sectors.

Ebo (2013) explains that the term, Information and Communication Technology (ICT) is the system used for handling information; it includes multi-media, the internet, other devices like video, cameras and mobile telephones. Quadri and Abomoge (2013) define a university undergraduate as “a university student who has not yet received a first degree or the body member of a university or a college who has not received a first degree; a student in any school yet to complete his or her course”. In an attempt to clarify the concept of “competence”, Weinert (2001) relates the term to the Greek notion of *arête*, meaning excellence or being the best. Also, it is compared to the Latin term, *virtus*, a kind of moral excellence generally understood as what people can do rather than what they know.

Competence is synonymous to ability, aptitude, capability, effectiveness and skills. It connotes discrete skills and activities that individuals can perform (Allan, 2011). Kyoshaba (2009) in Cambridge University Reporter (2003) states that academic achievement is frequently defined in terms of performance in examination, academic achievement, performance in tests, and course work.

STATEMENT OF THE PROBLEM

Due to the convergence of ICT, and so many different information resources, students are faced with information overload. They need certain special skills like information literacy skills to search for information, understand, evaluate, and apply what they find. Ilogho and Nkiko (2014) observed that most undergraduates contract their research projects and assignments because of their embryonic information literacy competence in ICT to source for information. Undergraduates in Nigerian higher institutions have always considered their academic achievements and performance as a vital part of their educational success. Therefore, low academic performances might lead to their expulsion, probation, and they might be asked to change their current course of study. This has made students to embrace ICT in order

to improve their academic performance. However, they are still faced with the challenges of not having the right ICT competence and literacy skills to adequately use these available ICT- based tools. This is the reason why this research tends to examine the Information and Communication Technology Competence and Literacy skills of undergraduate students in selected universities in Ogun State, Nigeria.

OBJECTIVES OF THE STUDY

The general purpose of the study is to assess ICT competency among undergraduate students. The specific objectives of the study are to examine:

- (i) The level of ICT competence among university undergraduates
- (i) The level of information literacy among university undergraduates
- (i) How ICT competence among undergraduate students is obtained
- (i) The effect of ICT usage on undergraduate students' academic performance
- (i) The challenges that may cause ICT incompetence among undergraduate students.

RESEARCH QUESTIONS

The following research questions were proposed in this study:

- (i) What is the level of ICT competence among university undergraduates?
- (ii) What is the level of Information Literacy among university undergraduates?
- (iii) How is ICT competence among undergraduate students obtained?
- (iv) What is the effect of ICT usage on undergraduate students' academic performance?
- (v) What are the challenges that may cause ICT incompetence among undergraduate students?

LITERATURE REVIEW

The use of ICT among students in higher learning

Due to information explosion, students are being taught how to critically think about what they are searching for

*Corresponding author. E-mail: nwosuj@babcock.edu.ng.

on the internet and to determine the right key words that would be useful for their search. ICT is therefore the combination of networks, hardware and software as well as the means of communication, collaboration and engagement that enable the processing, management and exchange of data, information, idea and knowledge. Thus, ICT includes the use of mobile phones, personal computer (PC) and internets, the main central tools that gave impetus to the most radical changes known today. These technologies are fast and automated, interactive and multimodal, and provide avenues for students to control how and when they learn (ACARA, 2010). Undergraduates of higher institutions are being prepared to become knowledge workers in the society; they are expected to acquire knowledge, skill, and attitude using information and communication technology in their academic pursuit, to enable them to improve their academic performance and careers in future.

ICT can enhance instructional delivery through its dynamic, interactive, and engaging content. It can as well provide real opportunities for individualized instructions. ICT has the potential to accelerate, enrich and deepen skills; motivate and engage students in learning (Eze and Nwangbo, 2013). Students can play important roles in technologically infused literacy classrooms. They have the responsibilities to use technology as an effective tool in their pursuit of learning; they are to use technology wisely and ethically, and help others become experts in technology. They feel empowered by this opportunity and think they add value to knowledge when they present a set of materials in a unique way that has never be done. Information and communication technology does not only have the potential to introduce new teaching and learning practices, but can also act as a catalyst to revolutionize the education system. It can empower teachers and learners and promote the growth of skills necessary for the 21st century work place.

Academic achievements among university undergraduates

Students' academic achievement has always been an area of great concern for teachers, parents and the entire university administration; it is the determinant factor of outcome of learning, teaching and curriculum development. At the end of every school year (which varies for almost every university in the country), students' academic achievements are reviewed. Some of these students are celebrated, especially through giving of prizes and awards, while some are immediately employed as academic and non-academic staff. They are recognized as leaders by their colleagues. However, for those with poor performance the aftermath may include expulsion, academic probation, changing of current course of study, academic insecurity during their

course of study and low self-esteem.

Amasuomo (2015) quoting Universities Admission Center reported that "tertiary institutions in Austria have found that all the academic achievements of an undergraduate are the best single predictors of tertiary success for most tertiary courses" p.195. The most widely used term for undergraduates' academic achievement is their Grade Points Average (GPA) or Cumulative Grade Points Average (CGPA); it is also the "yardstick" used to measure the academic achievements and output of students, teachers, and the university. To improve in their academic performance, undergraduates are now being charged to advance their existing knowledge by using the best sources and resources to support their academic functions. The use of ICT is regarded as the best medium for handling information; it includes multimedia, the internet, and devices such as video, cameras and mobile telephones, personal computer (PC) or laptop, smart phones. These gadgets, when connected to the internet, can provide access to large volume of information (Ebo, 2013).

ICT competence and literacy among undergraduates

Technology has now become the most preferable means of generating and disseminating information, hence the society is increasingly conscious of technology literacy. It is seen as a continuum of knowledge, skills and strategies that individuals acquire in the course of their lives through interactions with peers and communities around them (Panel, 2002). The 21st century, also called ICT literacy or new literacy, is not only the traditional literacy concept of being able to read and write fluently, but is also the ability to judiciously utilize and incorporate the new technologies in order to communicate with others (21st Century Skills, 2006).

Quoting Oye et al. (2012: 125), "*the term ICT literacy or technological literacy can be considered as the ability to know and use technology skillfully. ICT literacy refers to the application of technology effectively as a tool to research, organize, evaluate and communicate information. It also includes the use of digital technologies (computers, PDAs, media players, GPS, etc.), communication/networking tools and social networks appropriately to access, manage, integrate, evaluate and create information to successful function in a knowledge economy.*" In higher institutions of learning, information literacy and ICT competence are necessary skills for students to recognize when information is needed and have the ability to locate, evaluate, and use such information to enable them improve their academic performance. ICT literacy may be grouped into three classes: class one is knowledge of technology; the second class is skill relevant to using technology, and the third is attitudes accrued from critical reflection of

Table 1. Showing the summary of respondents' demographic data.

Demographic Information	Response	Percentage
Level		
100L	46	15.3
200I	63	21
300L	66	22%
400L	114	38.0%
500L	11	3.7%
Gender		
Male	162	53.3
Female	138	46.7
Age		
15-20	138	46.0
21-25	92	30.6
26-30	65	21.7
31-45	5	1.7

technology use. Ogunlana et al. (2013) explained that information literacy augments students' competence in evaluating, managing and using information. It is now considered as a vital competency for all university students to have. ICT competency is now of high priority in every aspect of life to fit into the digital world. Ofoegbu and Uche (2013) indicated that the potentials of ICT to improve instruction can help to present information in many forms, make learners to be more confident in the learning process, communicate effectively in any process, become independent learners and good beginners, improve their writing skills, give rise to greater problem solving and critical thinking skills.

Quoting Rao (2009: 201), the *"use of technology helps to facilitate students' research project, helps students develop a hypermedia program for learning a particular topic, and helps them to maximum their instructional time. Such a blend of students' research and technology can enable them to work on self-paced and meaningful projects while avoiding the typically unproductive time of waiting for help or waiting to be told what to do next"*.

METHODOLOGY

The study investigates the ICT competence and literacy among undergraduates as a determinant factor of academic achievement in Tai Solarin University of Education (TASUED), Ijagun, and Babcock University, both in Ogun State, Nigeria. Descriptive survey design was adopted for this study. The population studied consisted of 10,713 students from TASUED comprising 4 colleges (COSIT, COHUM, COSMAS and COAEVOT).

The university population consists of 10,000 students comprising 9 colleges: School of Agriculture and Industrial Technology, Babcock Business School, College of Health and Medical Sciences,

School of Science and Technology, School of Computing and Engineering Sciences, School of Education and Humanities, School of Law and Security Studies, School of Nursing, School of Public and Allied Health. Simple random sampling was used to select a sample of 170 respondents from Babcock University and 130 respondents from TASUED. There was a total of 300 respondents (from 100-400 level). A structured questionnaire was used to collect the primary data. The questionnaires were distributed to the students to and collected immediately for analysis.

RESULTS

In the questionnaire, the percentage of students who correctly answered every question was analyzed descriptively, using Statistical Package and Service Solution (SPSS). From Table 1, it is gathered that 46 (15.3%) of the respondents are 100L students; 63(21%), 200L; 66(22%), 300L; 114(38%), 400L, while, 11(3.7%), 500L students. Also, the age range of 15-20 was 138(46%); 21-25, 92 (30.6%); 26-30, 65(21.7%), while 31-45, 5(1.7%).

Research Question One: What is the level of ICT competence among university undergraduates?

Table 2 shows that 80% of the respondents had ICT-competency in computers/smart phones operations, word processing, spreadsheet, PowerPoint presentation, and internet operation. 66.3% of the students can install antivirus in their computers and phones while 33.7% cannot do it. These findings show that most of the respondents' level of ICT-competency is very high. However, 29% of the respondents cannot make cell

Table 2. showing the level of ICT- competence among undergraduate students.

ICT Competence	Yes(%)	No(%)
Computer /Smart Phone Operation		
Ability to install and uninstall applications on their devices	289(96.3)	11(3.7)
Create and manage files and folders in my computer	277(92.3)	23(7.7)
Save files into my Google drive, sky drive, ICloud, flash drive or CDs.	268(89.3)	32 (10.7)
Print documents	279(93.0)	21(7.0)
Protect my computer from virus	199(66.3)	101 (33.7)
Download and view documents and files	285(95.0)	15(5.0)
Word Processing (Microsoft Word), Spreadsheet (Microsoft Excel) and Presentation (Microsoft PowerPoint)		
Create, Save and exit documents	284(94.7)	16(5.3)
Ability to edit a document (Bold, italicize and underline, change font color, Cut, copy and paste text or graphics)	251(83.7)	49 (16.3)
Use shortcut icons	264 (88.0)	36 (12.0)
Make a cell active	211 (70.3)	89 (29.7)
Change slide design	238 (79.3)	62 (20.7)
Ability to create and add a new slide	250 (83.3)	50 (16.7)
Use PowerPoint for my presentations	253 (84.3)	47 (15.7)
Internet Operation		
Open internet explorer and other web browsers	292 (97.3)	8(2.7)
Ability to search for information using different search engines	275 (91.7)	25(8.3)
Ability to compose, attach file to email and send e-mail messages	272 (90.7)	28(9.3)
Access my Emails	285 (95.0)	15(5.0)
Download and save files online	292 (97.3)	8(2.7)
I use the social media to get updates on my academic field of study	252 (84.7)	48 (16.0)

Table 3. Showing the level of Information Literacy among undergraduate students.

Information literacy Level	Yes(%)	No(%)
Can you limit search strategies by subject, language and date?	195(65.0)	105(35.0)
Can you decide where and how to find your information for your research and assignments?	201(67.0)	99 (33.0)
Can you determine the authoritativeness, correctness and reliability of the information sources?	188(62.7)	112(37.3)
Can you select information most appropriate to the information you need/want for your assignment and research?	122(40.7)	178(59.3)
I have learned from my information problem solving experience and have improved my information literacy skills	259(86.3)	41(13.7)

active in Microsoft excel.

Research Question Two: What is the level of Information Literacy among university undergraduates? Table 3 depicts that 65% of the respondents can limit their search strategies by subject, language and date, while 35% cannot. 67% of the respondents can decide where and how to find information for their research and

assignments, while 33% cannot. Also, 62.7% of the respondents can determine the authoritativeness, correctness and reliability of the information sources, while 37.3% cannot.

More than half of the respondents (59.3%) said that they cannot select information most appropriate to the information they need/want for their assignment and research, while, 40.7% can do so. In conclusion, 86.3%

Table 4. Showing how ICT competence among undergraduate students is gotten.

Student's ICT Competence before or during their academic admission	SA (%)	A (%)	D (%)	SD(%)
I got my training on the use of ICT from the University, through the general courses been taught on computer applications and use, Vocational Training and Departmental courses.	33 (11.0)	74 (24.7)	115(38.3)	78(26.0)
I got my training from professional training courses on computer applications and use. E.g. New Horizon, Microsoft certifications etc.	113 (37.7)	87(29.0)	77 (25.7)	23 (7.7)
I got my training from my parents, colleagues, Classmates, friends, and self-development.	76 (25.3)	104(34.7)	107(35.7)	13 (4.3)
I got my training by attending a diploma or certification course training in computer sciences, e.g. HND, Dip, ND1 and NDII, etc.	35 (11.7)	48 (16.0)	128(42.7)	89(29.7)

Table 5. showing the effect of ICT usage on undergraduate students' academic performance.

Effect of ICT usage on undergraduate students' academic performance	SA (%)	A(%)	D(%)	SD(%)
The use of ICT has helped me to improve my academic grades	49 (16.0)	50 (17.3)	123 (41.0)	76 (25.3)
I earn better grades when I apply or use ICT during class presentation, research and assignments.	98 (32.7)	146 (48.7)	31(10.3)	25(8.3)
My ability to use ICT has made me to assist my colleagues when they face problems in using ICT.	60 (20.0)	187 (62.3)	47(15.7)	6(2.0)
I will like to teach my course mates on how to use various software.	108 (36.0)	103 (34.3)	63(21.0)	26(8.7)
ICT has made me get instant message on current issues on my field of study via my computer /smart phone.	114(38.0)	111 (37.0)	53(17.7)	22(7.3)
With my knowledge of ICT sourcing for information is no longer as difficult as before.	76(25.3)	150 (50.0)	51(17.0)	23(7.7)

of the respondents have agreed that they are still learning from their information problem solving experience to improve their information literacy skills.

Research Question Three: How is ICT competence among undergraduate students obtained?

Table 4 reveals that 11% strongly agreed and 24.7% agreed that they got their training on how to use ICT through general courses like; GNS, GEDS, Vocational training computer courses, and departmental courses being taught on computer application and use, while 38.3% of the respondents disagreed and 26% strongly disagreed with the statement. Also, it was revealed that 37.7% strongly agreed and 29% agreed that they got their training from professional training courses on computer applications and use; e.g. New Horizon, Microsoft certifications etc., while, 25.7% disagreed and 7.7% strongly disagreed with the statement. It was also revealed that 25.3% of the respondents strongly agreed and 34.7% agreed that they were trained by their parents, colleagues, classmates, friends, and self-development. On the other hand, 35.7% strongly disagreed and 4.3% disagreed with the statement.

In conclusion, 11.7% strongly agreed and 16% agreed

that they got their training by attending a diploma or certification course training in computer sciences, e.g. HND, Dip, ND1 and NDII, etc. while 42.7% of the respondents disagreed and 29.7% strongly disagreed with the statement.

Research Question Four: What is the effect of ICT usage on undergraduate students' academic performance?

Table 5 indicates that from the majority of the respondents (50%) in the two groups merged (SA+A) and (SD+D), the result reveals that the respondents in both schools have better grades when they apply or use ICT during class presentation, research and assignments. Their ability to use ICT has made them capable of assisting their course mates when they are faced with problems in using ICT. It has also revealed that ICT has enabled them to teach their course mates on how to use various software and that ICT has made them receive instant messages on current issues on their field of study via computers /smart phones. Finally, the knowledge of ICT has made easier the sourcing of information.

Research Question Five: What are the challenges that may cause ICT incompetence among undergraduate

Table 6. Showing the possible causes of ICT Incompetence among undergraduate students.

Challenges that may cause ICT incompetence	SA (%)	A(%)	D(%)	SD(%)
Fear of Addiction	86 (28.7)	87 (29.0)	74 (24.7)	33(17.7)
Poor/Inadequate information literacy and training programme in the university	113 (37.7)	147 (49.0)	31(10.3)	9(3.0)
Lack of finance to purchase ICT devices	93 (31.0)	105 (35.0)	79(26.3)	23(7.7)
Network authentication/ restriction from students	108 (36.0)	110 (36.7)	49(16.3)	33(11.0)
Lack of finance to subscribe or purchase Data for browsing	120 (40.0)	106 (35.3)	49(16.3)	25(8.3)
Slow Bandwidth of my Network Provider	146 (48.7)	113 (37.7)	22 (7.3)	19(6.3)
Epileptic electrical power supply	148 (49.3)	113 (37.7)	28(9.3)	11(3.7)

students?

Table 6 shows that majority (65%) of the respondents strongly agreed that network authentication/restriction from students, lack of power supply and slow bandwidth of network provider and poor/inadequate information literacy and training programme in the university are the major problems facing them in the use of ICT. While 30% of the respondents disagreed and strongly disagreed that lack of finance to purchase ICT devices can not cause ICT incompetence among university undergraduates.

DISCUSSION

The research also reveals that students are information literate in deciding where and how to source information for their research and assignments, have learned from information problem solving experience, have improved their information literacy skills and can limit search strategies by subject, language and date. The study depicts that 80% of the undergraduate students can use and operate their PC and smart phones and possess the ability to use word processing packages, e.g. Microsoft Word, Microsoft Excel and PowerPoint Presentation and Internet operation for their academic research. The plausible reason for this might be attributed to the fact that most of the students have smart phones and can use personal computer with internet connectivity which are readily accessible to them thereby facilitating high ICT-competency. This is also in line with the findings of ACARA (2010) and Eze and Nwangbo (2013) that ICT provides avenues for students to control how they learn, when they learn, and enhances instructional delivery through its dynamic, interactive, and engaging content; and it can provide real opportunities for individualized instruction.

The finding of the study also reveals that more than half of the respondents have reported that they did not get their training on how to use ICT through the general courses like; GNS, GEDS, Vocational training computer courses, and departmental courses on computer

application and use which is in contrast with the findings of Ogunlana et al., (2013) that teaching ICT in the classroom can augment students' ICT-competence.

The study also shows that more than half of the respondents possessed ICT-literacy skill not due to the institutions' efforts, but rather through personal efforts, self-development, assistance from classmates and parents, and training. This is in agreement with the findings of Dorah et al., (2013) that students acquire ICT-literacy skills through their interactions with friends and peers around them. Notably, the major finding of this study was that though the students' level of ICT-competence and literacy skill were very high, the undergraduate students cannot use it skillfully in their study. The plausible reason for this might be traced to the fact that most students were using these ICT-tools extensively for social interaction and information sharing among themselves and it has limited their ability to be able to use it to enhance their study. This implies that undergraduate students are still faced with the challenge of not being able to source and select information for their academic research, are not skillfully literate and competent in the use of ICT. This corroborates Allan (2011)'s submission that without ICT competence and skills, students will not be able to perform well in their academic activities.

Conclusion

This paper investigates the Information and Communication Technology competence and literacy of undergraduate students in Babcock University and Tai Solarin University of Education and has reached the following conclusions:

- (1) Regarding computer literacy of the students, undergraduates in TASUED and BU are competent in the use of ICT.
- (2) The research also reveals that undergraduate students in Ogun State are ICT literate.
- (3) 60% of the undergraduate students covered in this

study got their ICT-literacy skills from colleagues, classmates, friends, self-development and training from professional courses on computer applications, with less contribution from the university ICT courses.

(4) This study shows that students earn better grades when they apply or use ICT during class presentation, research and assignments, assist their course mate when they face problems in using ICT.

(5) Network authentication/restriction from students, lack of power supply and slow bandwidth of network provider and poor or inadequate information literacy and training programmes in the university are identified as the major problems facing them in the use of ICT.

IMPLICATIONS TO LEARNING

The use of ICT in a digitalized world is a vital tool for providing opportunities for students. It is not only to learn, but to define, locate, recognize, evaluate, and use acquired information knowledge to solve practical educational problems within and outside the four walls of the classroom. The use of ICT, particularly computer, stimulates a new atmosphere where students can utilize modern ICT resources for effective instructional learning in order to promote their academic achievement.

RECOMMENDATIONS

Some recommendations were made at the end of this study. These include:

ICT competence should be a major area of concern of students, parents, university administrators and should be regarded as a factor for the academic performance of the students.

The universities curriculum on the GNS, GEDs, Vocational Training in Computer and Departmental courses should be well structured to augment students' computer literacy skills. Problems such as poor electricity supply deterring ICT usage should be addressed to encourage the frequent use of ICT in the teaching and learning process. More so, the university administration should allow students use the internet facilities (Wi-Fi) and some websites can be filtered to reduce abuse and unnecessary wasting of internet data by students. Information literacy should be included in their curriculum to give better understanding on how to really use the available skills acquired in ICT to boost their academic achievement and performance.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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Full Length Research Paper

Indicators of characteristics of Learners Autonomy in English Language of Primary 6 students in the Northeast of Thailand

Unjana Suphandee^{1*}, Sunan Sripai¹, Jamloong Woonprasert², Narumon Saengprom³, Sirisak Ardwichai¹ and Terdsak Suphandee¹

¹Department of Educational Research and Evaluation, Faculty of Education, Chaiyaphum Rajabhat University, Thailand.

²Faculty of Education, Ubon Ratchatani Rajabhat University, Thailand.

³Faculty of Education, Roi Et Rajabhat University, Thailand.

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This study aims to develop indicators of characteristics of Learners Autonomy in English Language of Primary 6 students in the Northeast of Thailand. The researcher used a mixed research methodology. The samples were divided into 2 categories which are qualitative and quantitative samples. On qualitative sample, 7 experts in humanities and social were interviewed to assess the development of indicators of characteristics of Learners Autonomy in English Language of Primary 6 students. The interview showed that there were 7 components and 32 indicators for teachers with experience and expertise in teaching English in Primary 6. After that 11 expert teachers have a group discussion to discuss the indicators of characteristics of Learners Autonomy in English Language of Primary 6 students. The group discussion showed that there were 4 components and 13 indicators. On quantitative research, 600 students were selected for second order confirmatory factor analysis of Learners Autonomy in English Language of Primary 6 students in the Northeast of Thailand. The instruments used were interviews and questionnaires. Data analysis was done using mean, standard deviation and confirmations. For analysis of findings of qualitative research methodology on Learners Autonomy in English Language of Primary 6 Students, there were 4 components and 13 indicators in multi-case studies as follows: Component 1, How to study, 4 indicators; Component 2, Problem solving skills, 3 indicators; Component 3, Self-efficacy, 3 indicators; Component 4, Love to learn, 3 indicators. The second order confirmatory factor analysis found that the model was statistically significant, based on the statistically validated statistics of the model: χ^2 was 651.829, df was 601, p-value of 0.0741, CFI was 0.995, TLI was 0.994, RMSEA was 0.012, SRMR was 0.026, and χ^2/df was 1.085.

Key words: Indicators, the characteristics, Learners Autonomy in English Language.

INTRODUCTION

The main goal of the development of education in Thailand is to produce quality learners and to offer a

*Corresponding author. E-mail: unjana21@windowslive.com.

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learning process that is required for the growth of individuals and society. It is the knowledge of the environment, society, learning and support factors necessary for people to learn throughout life. The National Education Act (2010) is consistent with the principle of education under section 22 where educational management is based. In this section, students are considered and they are given opportunity to learn and develop themselves. Educational process must encourage students to develop naturally and to maximize their potential. The 21st century learning defines the vision of educational reform in the second decade (2009-2018). According to The Ministry of Education (2010), "Thai people have a lifelong learning in quality". The focus is on three reforms which are quality development, education and learning, and educational opportunities. The opportunity for Thai people is to have access to quality learning and to participate in all sectors of society. Students with learners autonomy are able to recognize, reason and understand the issues that arise so they can solve problems and be innovative about the change of society and be happy in their life (Dimitrios, 2015).

Learners autonomy is an important skill for students of today's age and for members of the society who are changing rapidly. Learners autonomy makes the students love to learn for the development of knowledge, self-development and always seek knowledge to keep up with the changes of their society. Guglielmino (1977) explains that, learners will have confidence in themselves, good foresight, love to learn, plan to learn, knowing how to learn, learning skills and solutions if they have learner's autonomy. Learner's autonomy enables students to have responsibility for their own learning and evaluation of learning. Whenever students have the learner autonomy, they love to study without anyone having to force them. It also stimulates endless curiosity which will lead to life-long learners, a goal that today's educators expect and desire to give to every person.

The New Cambridge Institute (Thailand) focuses on learner autonomy as the instructor. The students will have to work regularly to propel teachers to review lessons learned and practice outside the classroom. Learner Autonomy is a teaching system that is widely used in western countries. In contrast to the traditional Thai teaching, the instructor often puts all the information to the learner. Learner Autonomy helps students to understand English naturally by emphasizing the general behavior of the learner. When students are learning they first listen and understand, when they understand the students begin to speak, read and write, respectively (New Cambridge Institute (Thailand), 2017).

Before the development of the learners autonomy under the concepts and theories mentioned earlier, it requires a significant and necessary indicator to develop the learner autonomy in English language. Currently, there are no clear indicators of characteristics of learner's autonomy in English language of primary 6 students.

However, there are studies that indicate that there are many factors that affect the characteristics of learner autonomy in English language, such as research on current English teaching and learning situations. The study results in 3 dimensions: (1) Educational administrators (School Director) who contribute to the development of the learning environment; (2) Teachers and learners must have positive opinions and beliefs about the use of self-reliant learning methods; (3) Parents are involved in parenting to develop their independence in learning English (Nantiyah and Nuntida, 2016).

Based on the results of the National Basic Educational Testing (O-NET), Primary 6 of Academic in 2016, English language program had an average score of 34.59, with the lowest scores in the five subjects. When considering regional scores, the average score in the northeast region was 31.01 points, with the lowest scores from all regions (National Institute for Educational Testing Service, 2016) and the data show that the quality of learners is still at an unsatisfactory level. It is important to return to the source of the problem that the students do not have quality and low achievement.

Learner's autonomy in English language is essential for learning English for people of different ages, amidst so many changes. Everybody has problems that affect their lifestyles. Learner's autonomy is an important skill to solve these problems in various scenarios and to make learning most successful. Researches have not yet found a way to develop a person who is characterized as having a good learning autonomy; this is because there are many varieties of characteristics in the learner's autonomy in English language. The researcher, therefore, was interested in developing the indicators for developing the characteristics of learner's autonomy in English language of Primary 6 students in the Northeast of Thailand. The results of the analysis will be the guidelines for the parents, teachers and other stakeholders to produce graduates that respond to the changing world. Other educational institutions and the related organizations can also obtain important information that will give guidelines for the promotion and the development of characteristics of learner's autonomy in English language which affect the education and the development of the country.

This study is centered on development of indicators of the characteristics of Learners Autonomy in English language of Primary 6 students in the Northeast of Thailand. Due to wide and vast nature of schools and provinces in Thailand, the research was carried out in the Northeast part of Thailand.

Objectives

(1) To develop the indicators of the characteristics of Learners Autonomy in English language of Primary 6 students in the Northeast of Thailand.

(2) To examine the consistency of the model of the indicators of the characteristics of learners autonomy in English Language.

Population and sample

The population in this study is based on Primary 6 students in the Northeast of Thailand on the Basic Education Commission. There were two sample groups as follows: Interviews, the researcher carried out structured interviews with 7 experts on Learners Autonomy in English Language; Eleven teachers were used in group discussing the development of indicators of characteristics of Learners Autonomy in English Language of Primary 6 students. These consisted of expert teachers in humanities and social sciences whom the researcher engaged to discuss the indicators of characteristics of Learners Autonomy in English Language of Primary 6 students.

A total of 600 students from 10 provinces in the Northeast of Thailand were used for the second order confirmatory factor analysis for the development of indicators of the characteristics of Learners Autonomy in English Language of Primary 6 students. To determine the sample size used for the development of the indicators, the concept of determining the number of samples to develop and validate the model was employed.

Research instruments

- (1) Interviews with the experts on Learners Autonomy in English Language.
- (2) Group discussion with teachers on Learners Autonomy in English Language.
- (3) The questionnaire on the characteristics of Learners Autonomy in English Language of the indicators.

Finding quality of tools

- (1) The questionnaire of Learner Autonomy in English Language is based on the development of the indicator by the researcher in phase 1.
- (2) The researcher took the questionnaire to 7 experts interviewed to check the content for validity, relevance of the question, clarity of language and form of measurement.
- (3) Analyze the data of the correlation coefficient between the questions of the measurement and the terminology using the Index of Item-Objective Congruence (IOC). Select the question with IOC value from 0.5 to 1.00
- (4) The researcher carried out a pre-research test of the questionnaires by giving out 70 questionnaires to Primary 6 students at Anuban Chaiyaphum School. The

researcher wanted to assess the validity and applicability of the questionnaires before dispatching them to intended respondents. The researcher wanted also to test the reliability of the Cronbach's alpha coefficient and the discriminant power of the measure.

(5) Analyze the data and make a complete questionnaire to the experimental group from 600 students in 10 provinces of Northeast of Thailand.

These are tools or methods used to collect data. For the purpose of this research, the researcher used interviews and questionnaires. Highlighted research instruments are facts finding strategies employed during data collection.

Questionnaires

The researcher distributed 600 copies of questionnaires to selected students who participated in the study. The researcher targeted 10 provinces from the Northeast Thailand and 60 students from each province were selected to complete the questionnaires. The researcher gave the questionnaires to the students to which they completed on their own. The teacher in the school of experimental group assisted the researcher by collecting the completed questionnaires from the selected students.

Structured questionnaire

The researcher designed a structured questionnaire which is guided by Likert scale (Table 1). The researcher employed Likert scale due to its relevance in responding to structured questionnaires. Structured questionnaires were preferred in this research study as the researcher interacted with a large number of people and at the same time information had to be gathered within a specified period of time.

Interviews

The researcher carried out structured interviews with 7 experts on Learners Autonomy in English Language. This research relied on the knowledge and experiences of respondents in their participation on learner's autonomy. The researcher made an appointment with the 7 experts on the most convenient day and time to carry out a face to face interview.

Validity and reliability

The researcher considered that collected data is valid and reliable by taking into account the following values explained.

Table 1. Likert scale.

Detail	Strongly agree	Agree	Moderate	Disagree	Strongly disagree
Ratings	5	4	3	2	1

Validity

The researcher cross checked every questionnaire to ascertain that it was completed and instructions were adhered to. The content was further supported by interviews carried out with 7 expert teachers who were the representatives of each institute before making another inductive analysis to modify the variables of characteristics of the Learners Autonomy in English Language to be in consistency with the reality.

Reliability

The questionnaire of Learner Autonomy in English Language is based on the development of the indicator by the researcher in phase 1. The questionnaire was assessed by 7 experts who evaluated the content, relevance of the question, clarity of language and form of measurement. The researcher carried out a pre-research test of the questionnaires by giving out 70 questionnaires to Primary 6 students at Anuban Chaiyaphum School to check for validity and applicability. The researcher issued out 600 questionnaires and 90% of the questionnaires were correctly responded to. This article was written under the guidance and supervision of seasoned professors.

Ethical consideration

The researcher observed ethical considerations during data collection. Respondents were given freedom to respond to any questions in the manner they wanted. There was no undue influence in trying to persuade the respondents to answer the questionnaires in the way that is favorable to the researcher. The researcher emphasized that the respondents should not put their names on the questionnaires. All information collected during this research is purely for academic purposes and will be guarded with such integrity.

METHODOLOGY

Here, the methods and techniques that the researcher employed during data collection process were explained. It dwells on research design that the researcher implemented to provide valid and reliable information to research objectives formulated. The formulated research design enabled the researcher to collect relevant data and information in developing indicators of characteristics of Learners Autonomy in English Language of Primary 6 students in the Northeast of Thailand.

Research design

The researcher employed qualitative and quantitative research techniques in order to acquire sufficient information before giving a conclusion. According to Business Dictionary (2015), a research is a systematic investigation process employed to increase or revise current knowledge by discovering new ideas and facts. Webster (2015) postulated that a research is a studious inquiry aimed at uncovering new knowledge and ideas. The general view of research is therefore viewed as an investigation or a study that brings new information to the body of knowledge (Cresswell, 2009).

Qualitative research

Qualitative research methodology was used to generate the characteristics of Learners Autonomy in English Language of Primary 6 students in the Northeast of Thailand. Study theories, textbooks, academic literature, and related research papers relating to characteristics of Learners Autonomy in English Language, and the concepts of foreign academics before making the content analysis for drafting of variables of the development of indicators of Learners Autonomy in English Language before using them in the interviews for the opinions of 7 experts on education. The data were analyzed and summarized to create the variables of the Learners Autonomy in English Language.

To develop and modify variables of Learners Autonomy in English Language, the researcher contacted interviews with 7 teachers who were the representatives of each school before making another inductive analysis to modify the variables of characteristics of the Learners Autonomy in English Language to be in consistent with the reality. The researcher also made use of the group discussions, eleven teachers were used in discussing the development of indicators of characteristics of Learners Autonomy in English Language of Primary 6 students.

Quantitative

Due to inherent limitations of qualitative research method, the researcher also employed quantitative research to obtain numerical and statistical data. To collect quantitative data the researcher designed and employed structured questionnaires to gather statistical data pertaining to the objectives of the study. The data from 600 students in 10 provinces of Northeast of Thailand was collected. The students were given the questionnaires to which they completed on their own. The teacher in the school of experimental group collected the completed questionnaires to help the researcher. The researcher then examined the consistency of the model of the indicators of the characteristics of Learners Autonomy in English Language between the hypothetical assumptions and analyzed empirical data by second order confirmatory factor analysis using Mplus Program version 7.2.

RESULTS

Step1

The results of the development of the indicators of the

Table 2. The results of the development of the Learners Autonomy in English Language of primary 6 Students in the Northeast of Thailand.

No.	The indicators of the characteristics of the Learners Autonomy in English Language of Primary 6 students in the Northeast of Thailand
1	Students have a learning process
2	Students have to learn by using learning many resources
3	Students have the skills to research
4	Students know their advantages and limitations
5	Students have the skills in listening, speaking, reading and writing
6	Students can make decisions and solve problems
7	Students gather information in a variety of ways to solve problem
8	Students have positive self-opinions
9	Students have their own identity
10	Students are confident that they can learn
11	Students see the importance of learning
12	students have funny, happy enthusiasm for learning
13	Students appreciate who love learning

Learners Autonomy in English Language using qualitative research methodology by studying theories, textbooks, documents, research papers related to the characteristics of the Learners Autonomy in English Language, and 32 indicators were obtained.

Step2

The researcher drafted structured questions which were used for the interviews with 7 experts on education. The data was analyzed and summarized to create the variables of the characteristics of Learners Autonomy in English Language. In addition, the in-depth group discussions were done with 11 teachers who were the representatives of each school. The data was analyzed and summarized in order to adjust the variables of the characteristics of Learners Autonomy in English Language which were completely consistent with the actual situations. Subsequently, 13 indicators were obtained as shown in Table 2.

Step3

The consistency of the model of the measurement of the indicators of the characteristics of the Learners Autonomy in English Language of Primary 6 students in terms of hypothesis and the empirical data were verified by the second order confirmatory factor analysis using the Mplus Version 7.2 program. The results are discussed as the following.

From table 3, when the standardized factor loading (β) of the model was considered, all indicators were statistically significant at 0.01 level. Indicator with the highest factor loading was the third component: the

indicator L10 "Students are confident that they can learn" ($\beta = 0.999$); followed by the third component again, the indicator L9 "Students have their own identity" ($\beta = 0.998$); and the second component, the indicator L5 "Students have the skills in listening, speaking, reading and writing" ($\beta = 0.988$), respectively.

When the coefficient of determination (R^2) of all indicators was considered, it ranged from 0.006 to 0.651. The indicator with the highest coefficient of determination (R^2) was the third component: the indicator L10 "Students are confident that they can learn" ($R^2 = 0.998$); followed by the third component again, the indicator L9 "Students have their own identity" ($R^2 = 0.997$); and the first component, the indicator L5 "Students have the skills in listening, speaking, reading and writing" ($R^2 = 0.976$), respectively.

Form table 3, When the standardized factor loading (β) of the model was considered, all of the components were statistically significant at 0.01 level. The component with the highest factor loading was the third component which was self-efficacy ($\beta = 0.980$), followed by the fourth component which was love to learn ($\beta = 0.958$), the second components which was problem solving skills ($\beta = 0.955$), and the second components which was how to study skills ($\beta = 0.952$), respectively.

When the coefficient of determination (R^2) of all components was considered, it ranged from 0.006 to 0.651. The component with the highest coefficient of determination (R^2) was the third component: self-efficacy ($R^2 = 0.960$); followed by the fourth component, love to learn ($R^2 = 0.918$); the second component which was how to study the skills ($R^2 = 0.913$); and the first component, how to study skills ($R^2 = 0.906$), respectively.

From Table 4, the results of the second order confirmatory factor analysis of the characteristics of the

Table 3. The statistical results of the second order confirmatory factor analysis of the indicators of the characteristics of the Learners Autonomy in English Language of Primary 6 students.

Component	Indicator	Factor loading (b)	Standardized factor loading (β)	SE	Z	R ²
How to study	L1	1.000	0.941	0.028	33.577	0.886
	L2	1.312	0.877	0.026	33.879	0.769
	L3	1.455	0.963	0.019	51.730	0.928
	L4	1.441	0.916	0.023	40.049	0.839
Problem solving skills	L5	1.000	0.988	0.029	33.520	0.976
	L6	0.946	0.987	0.002	607.383	0.973
	L7	1.182	0.922	0.006	142.337	0.851
Self-efficacy	L8	1.000	0.984	0.017	58.292	0.968
	L9	1.011	0.998	0.024	42.188	0.997
	L10	1.049	0.999	0.000	4138.172	0.998
Love to learn	L11	1.000	0.903	0.021	43.834	0.815
	L12	1.051	0.982	0.018	53.352	0.964
	L13	0.885	0.950	0.022	43.454	0.903

Table 4. The statistical results of the second order confirmatory factor analysis of the components of the characteristics of Learners Autonomy in English Language of Primary 6 students.

Component	Factor loading (b)	Standardized factor loading (β)	SE	Z	R ²
How to study	1.000	0.952	0.011	88.893	0.906
Problem solving skills	1.500	0.955	0.010	98.093	0.913
Self-efficacy	1.581	0.980	0.011	89.594	0.960
Love to learn	1.616	0.958	0.012	81.914	0.918

Learners Autonomy in English Language of Primary 6 students revealed that the model had structural consistency. This can be considered from the statistical values used to verify the validity of the model as follows: $\chi^2=651.829$, $df = 601$, p -value = 0.0741, CFI = 0.995, TLI = 0.994, RMSEA = 0.012, SRMR = 0.026 and $d\chi^2/df = 1.085$ as shown in Figure 1 and Table 5.

It can be concluded that the model of standard measurement and the indicators of the Learners Autonomy in English Language of Primary 6 students. The order confirmatory factor analysis had structural consistency or was highly correlated with the empirical data. That is, all standards and indicators in the model were important standards and indicators and had relationships in supporting each other.

DISCUSSION

The results of the development of the indicators of the Learners Autonomy in English Language in the Northeast

of Thailand revealed 4 components and 13 indicators as follows: English learning of students by British Council (2013), Benson and Voller (1997), Wenden (1998), and Chatchapong (2009); the relevant research papers will discuss the results as components.

Component 1 (learning how to learn as followed by students)

Students have a learning process which uses learning resources, students have the skills to research and know their advantages and limitations. Wenden (1998), Dam (1990), Dickinson (1993), Sinclai (1997), and Gardner and Macintyre (1996) stated that students have access to learning strategies to reach their goals and reach their learning style. Dam (1990), Dickinson (1993), Sinclair (1997), and Gardner and MacIntyre (1996) agreed on Dickinson's characteristics of the learners autonomy in students. Students have the ability to understand what the teacher teaches, choose the appropriate learning

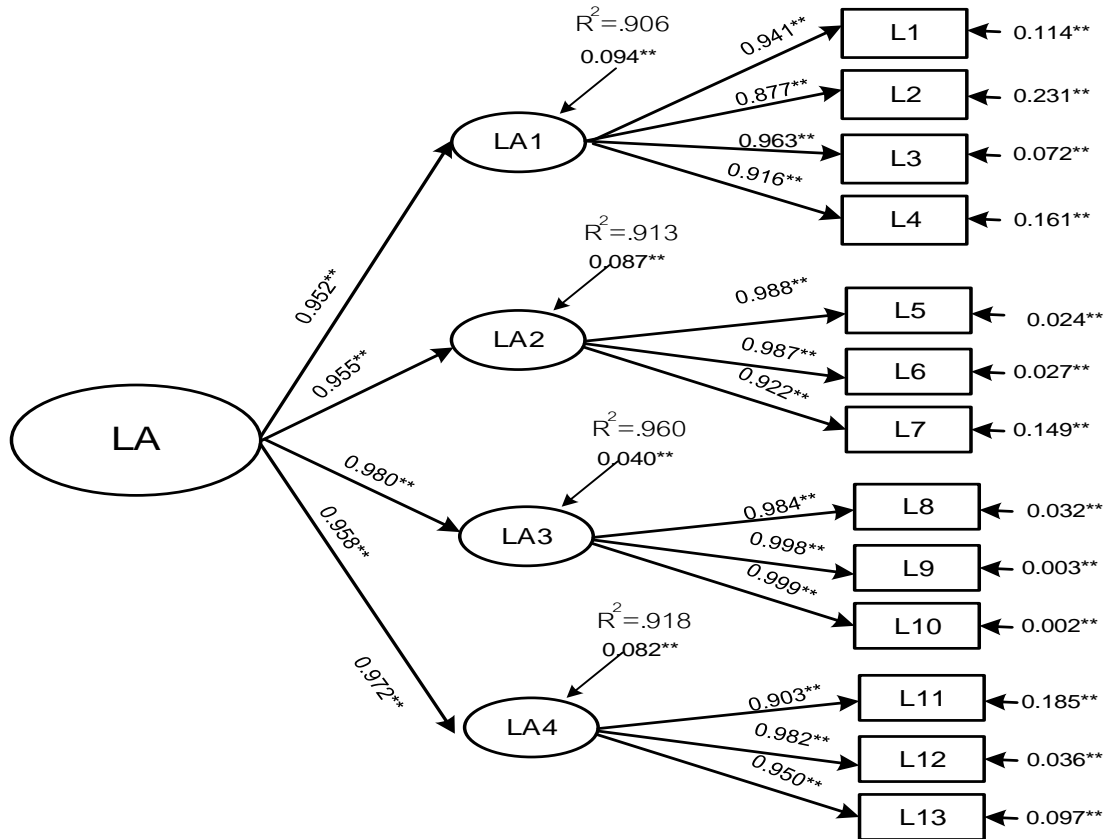


Figure 1. The verification of the model by second order confirmatory factor analysis of the characteristics of the Learners Autonomy in English Language of Primary 6 Students. $\chi^2=651.829$, $df = 601$, $p\text{-value} = 0.0741$, CFI = 0.995, TLI = 0.994, RMSEA = 0.012, SRMR = 0.026, $\chi^2/df = 1.085$.

Table 5. The statistic values used to verify the validity of the model by section order confirmatory factor analysis of the characteristics of Learners Autonomy In English Language of Primary 6 students.

Latent variable	χ^2	Df	χ^2/df	p-value	CFI	TLI	RMSEA	SRMR
F	651.829	601	1.085	0.0741	0.995	0.994	0.012	0.026

strategies and can follow the results of strategies which can result in better learning (Dickinson, 1993). Gardner and MacIntyre (1996) highlighted that learner’s autonomy in English language enables students to initiate the learning plan by themselves and learners autonomy can be learned both in and out of the classroom (Sinclair, 1997).

Component 2 (Problem solving skills)

Problem solving skills is the component of learner autonomy in English language because learners autonomy in English language is an era that needs problem solving skills. These skills are listening, speaking, reading, and writing decision; in this regard students

make decisions and solve problems. Students can gather information in different ways to solve problems which is also in line with Guglielmino's features of ability to use skills, knowledge, and problem solving skills. Students have the ability to use basic skills in education, including listening, reading, writing, and remembering skills (Guglielmino, 1977). An important aspect of the learner is the freedom to learn and students can be corrected and have self-assessment (Dickinson, 1993).

Component 3 (Self-efficacy)

It is the component of the learner’s autonomy in English language because we are in an era that students have

positive self-opinions and they have their own identity. According to Guglielmino (1977), there is a strong sense of effective student learning, innovation and learners autonomy as students are confident that they can learn. Students have the responsibility for their own learning, good foresight and have creative thinking (Guglielmino, 1977). It is also in accordance with Benson and Voller (1997) learning autonomy feature, where self-directed learning is defined. Student can be self-taught in various situations. It is also in accordance with Sinclair (1997), who discusses the important aspects of being free to learn that a person is self-directed. Learners must be able to judge their own learning. Students have positive attitude towards responsibility to learn and intentions that can strengthen the learning. Students with learner's autonomy will have a high responsibility and can do anything or be the best (Sinclair, 1997).

Component 4 (Love to learn)

It is the component of the learners autonomy in English language because in this era students see the importance of learning. They have funny, enthusiasm for learning and appreciate the love to learn. It is also in accordance with Guglielmino (1977) who said that students love to learn, be enthusiastic about learning new things. In line with the feature of Benson and Voller's freedom of learning, there is an incentive to learn. In order for the learner's autonomy to be effective, students must love to learn and be able to learn from it. Anantasak discussed the important aspects of the learner's autonomy; the author highlighted that students must be ready and be willing to take responsibility for learning.

RECOMMENDATIONS

The researcher developed the method using the mixed methodology, sequential equivalent design, which made the research more reliable and consistent with the feature of learner autonomy of Primary 6 students.

The results of this research were collected from students of 10 provinces in the Northeast of Thailand. The data collected by the school can be used to identify the characteristics of the students.

The indicator of learner autonomy developed by the researcher is 4 indicators. Each indicator was statistically significant at 0.01 and had the same weight. All of the indicators are important, so the researcher must focus on all the indicators.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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