IOSR Journal Of Humanities And Social Science (IOSR-JHSS)
Volume 24, Issue 2, Ser. 4 (February. 2019) 09-21
e-ISSN: 2279-0837, p-ISSN: 2279-0845.
www.iosrjournals.org

Advancing Functional Adult Literacy through Mobile Technology in Ethiopia

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Abstract: In today's increasingly inter-connected and technologically advanced world within which lifelong learning takes place, internationally & continentally agreed goals-EFA, SDGsand CESAhave provided new contexts for adult education. Mobiles are being used as key tools to promote individualized learning apart from their role in communication like in updating knowledge and skills related to their job and interests by saving travel costs and allowing a flexible schedule. The main purpose of this study was to assess the status of the literacy level and the situation of literacy environment to integrate mobile technology in adult literacy program in the selected districts of the target regions (Amhara, Oromia, and SNNPR) of Ethiopia. The study was aimed to measure the performances of adult learners in four competency areas (reading, writing, numeracy,digital skills). The study used a mixed research design whereby both qualitative and quantitative research approaches. Associated to this, the descriptive survey and exploratory method were used for situation analysis, and testing was conductedto assess the performance of adult learners. Data were collected from both primary and secondary sources through documentary analysis. A combination of systematic random sampling, stratified random sampling, and purposive sampling were applied in order to select the right participants in the study and collected data were analyzed by using descriptive statistics. Moreover, the qualitative data from the open-ended questions were described and embedded with the quantitative ones.

Key words: functional adult literacy, literacy, M-learning

Date of Submission: 28-01-2019 Date of acceptance: 11-02-2019

I. INTRODUCTION

1.1. Background

The centrality and importance of education as a fundamental 'human right' has been well documented in the literature, including national and international policy documents. All who have mediated on the art of governing humankind have been convinced that the fate of empire depends on the education of their citizens, including children, youth and adults. From these statements, it is clear that any nation looking for a lasting economic success must raise the literacy level of its citizens. Cognizant of such a fact, the World Education Forum that convened in Dakar in 2000 adopted the Dakar Framework for Action (DFA) to Achieve Education for All (EFA) by 2015 and Unite Nations Educational, Scientific and Cultural Organization (UNESCO) has been recognized as the lead actor for EFA. Moreover, the importance of literacy as a stepping-stone to socio-economic development has been a universally accepted fact as the following quotation asserts,

Literacy is an indispensable foundation that enables young people and adults to engage in learning opportunities at all stages of the learning continuum. The right to literacy is an inherent part of the right to education. It is a prerequisite for the development of personal, social, economic and political empowerment. Literacy is an essential means of building people's capabilities to cope with the evolving challenges and complexities of culture, economy and society" (CONFINTEA 6, 2009). [5]

Though the governmental and non-governmental organizations of different countries take responsibilities for ensuring that their populations have an opportunity to become educated and thus receive these benefits. Yet, the results attained so far have been far from satisfactory (UNESCO, 2014). [5] Out of about 774 million illiterate adults in the world with the vast majority of them found in developing countries, women account nearly 2/3 of the illiterate adult population. Since 2000 because of high population growth rates in developing countries and inadequate adult literacy programs, the number of illiterate adults increases dramatically.

In line with EFA goals, Ethiopia has already exerted much effort in primary, secondary and tertiary education even prior to the on-set of EFA, particularly as of 1994. The educational provision in Ethiopia, (ETP, 1994) [5] has articulated five main national goals:

i. To develop the physical and mental potential and the problem-solving capacity of individuals by expanding education and in particular by providing basic education for all;
ii. To bring up citizens who can take care of and utilize resources wisely, who are trained in various skills, by raising the private and social benefits of education;
iii. To bring up citizens who respect human rights, stand for the well-being of people, as well as for equality, justice and peace, endowed with democratic culture and discipline;
iv. To bring up citizen who differentiate harmful practices from useful ones, who seek and stand for truth, appreciate aesthetics and show positive attitude towards the development and dissemination of science and technology in society and
v. To cultivate the cognitive, creative, productive and appreciative potential of citizens by appropriately relating education to environment and societal needs (ETP, 1994).[5]

The educational provision policy (ETP, 1994) [5] has been supported with a 20 year Education Sector Development Program (ESDP), which is packed with different actions and strategies. As a result, considerable improvements have been made in terms of increasing access, equity, and relevance of education at primary, secondary and tertiary levels.

However, the country's-Ethiopia attempt to ensure accessibility of education for the adult population is characterized by critical gaps in provision. According to CSA (2012) [2], the literacy rate stands at about 42% (one of the lowest in sub-Saharan Africa). It is estimated that close to 20 million adults (2/3 women) still need sufficient functional literacy skills to enable them to improve their livelihoods (generate self-employment, improve their productivity, diversify their income, etc.). Consequently, the Ethiopian ESDP V (2016-2020) [2] has identified adult literacy to be one of the top six priority areas of education. Accordingly, adult literacy is aimed at addressing the need for quality and productive human power to drive the economic development and realize the Ethiopian government has stated ambition to be a middle-income country by 2025. Hence, in the coming five years (2016-2020), the key adult and non-formal education is expected to meet the following three goals:

- to increase the functional adult literacy rate in Ethiopia;
- to improve the skill levels of facilitators and adult education tutors; and
- to improve the coordination and quality of adult education in communities.

Based on the above-mentioned goals and education sector program outcomes, Ethiopia MoE is**Advancing Mobile Literacy Learning** which, is pivotal to advance **anywhere** and **anytime** literacy learning in Ethiopia through innovative approaches and mechanisms for greater access and better results.

II. PURPOSE AND SCOPE OF THE STUDY

2.1 Purpose of the Study

The main objective of the study was to obtain evidence-based information on the current status of technology-assisted literacy learning for youth and adults and on how to effectively use mobile to serve the learners and communities toward better livelihoods and lifelong learning. The specific objectives were the following:

1. To assess the performances of adult learners in order to assert their level of competencies in literacy and digital skills;
2. To identify the availability and relevance of hands-on mobile/IT based learning materials developed to enhance "anytime, anywhere learning" at the grassroots;
3. To assess the existing practices on technology-assisted literacy learning provided to target learners by key actors mainly Ministry of Agriculture, Health, Microfinance, Mines etc. (services, challenges and opportunities).
4. To explore the existing conceptions and capacities of key literacy personnel on linking technology into functional adult literacy learning;
5. To analyze opportunities and challenges on multi-stakeholders partnership on technology-assisted FAE learning systems and services;
6. To suggest feasible points on how to effectively use technology to serve the learners and communities toward better livelihoods and lifelong learning.

2.2 Scope of the Study

Geographically the study was conducted in Ambo district from Oromia; DebreBirhanZuria district from Amhara; and Hawassa Zuria district from South Nations, Nationalities and People (SNNP) Regional states of Ethiopia and conceptually the study focuses on the following:

a) Assess the performance of adult learners in four (reading, writing, numeracy and digital) skill areas and establish baseline database.

b) Conduct situational analysis at national level, with particular attention to technology assisted innovative literacy learning interventions paying due attention to national and regional policy and strategy, curriculum, facilitators training, planning literacy learning activities undertaken by various stakeholders and attitudes of stakeholders toward provision of literacy learning anywhere and anytime.
c) Review the available documents on mobile literacy learning, best practices undertaken at national, regional and grass-root levels in promoting the mobile literacy learning.
d) Identify opportunities and gaps to effectively design and implement mobile literacy learning in Ethiopia.

III. TECHNICAL APPROACH AND METHODOLOGY

3.1 Research Design

The study focused on technology assisted functional adult literacy learning mainly in the context of rural communities. The study aimed at assessing the comprehensive picture (status and prospects) and insights on technology assisted literacy learning in support of better knowledge and skills so that livelihood of the target group could be enhanced.

With this grand objective in mind, the study was conducted based on participatory analysis by which all key stakeholders were directly involved in the study. In particular, participatory learning and active engagement of stakeholders (adult learners and literacy program coordinators at the Community learning centers (CLCs), primary schools principals) as appropriate characterized the assessment.

Furthermore, the study used a combination of both qualitative and quantitative techniques to gather and review data. The qualitative assessments provided in-depth information to help interpret the quantitative data and facilitated triangulation. In relation to this research design, the descriptive survey and exploratory method were used for situation analysis while testing was used for performance assessment of adult learners.

3.2 Data Sources and Data Collection Instruments

Data were collected from both primary and secondary sources. Secondary data were captured through documentary analysis through a literature review and the identification of current knowledge and information.

The primary data were captured through collection of first hand data from key stakeholders using field survey and learners performance tests. The field survey was conducted to obtain evidence-based information on the literacy learning programme, content and the variety of teaching and learning processes at the grassroots, the type of technology used by the adult learners and facilitators for learning and communication, the competencies of facilitators, the status of CLCs. Furthermore, emphasis was given to the issues of technology-assisted literacy learning process and knowledge and skills relevant to livelihoods and lifelong learning with focus on the use of information communication technologies (ICTs) in a gender-responsive perspective. To this end, a combination of appropriate methods were utilized to collect relevant data, including questionnaires, key informant interviews, focus group interview, critical observations and administering achievement tests (viz., literacy, numeracy, and digital skills measurement tests).

3.3 Development and Standardization of Tools

3.3.1 Achievement Tests

An attempt to measure the performance of adult learners is pioneering work in Ethiopia. Such a situation had in fact posed difficulty on the part to come up with an ideal achievement tests for Integrated Functional Adult Education (IFAE) learners in literacy, numeracy and digital skills for the first time in the country. Despite these challenges, based on the experience and international literature, the tests to measure the performances of adult learners in four competency areas (viz. writing, reading, computing, and using mobile technology) where developed.

Accordingly, the literacy (reading and writing) assessment tests were developed based on the Literacy Assessment and Monitoring Program (LAMP) scale designed by UNESCO to measure levels of progress of adult learners in reading and writing internationally. Hence, the literacy scales was developedin harmony with the LAMP scalein line with the national IFAE Curriculum Framework (MoE, 2011) [2], national IFAE Minimum Learning Competency (MCL) (MoE, 2014) [2], and regional IFAE learning materials of Year I and Year II.

While the digital skills test was designed by taking into account the level of difficulty and complexity of tasks encountered in operating and using mobile technologies. In this particular case, the test items were geared towards measuring the ability of the candidate in using mobile technology for accessing and using information related to market, health, weather, banking, income, and so forth. The levels and corresponding skill requirements of the aforementioned scales are presented in the table below.

TABLE 3.1: Levels of IFAE competencies measured

Level of competency	Skill requirements		
	Literacy (reading and writing)	**Numeracy**	**Digital**
Level 0	Cannot read and write letters	Cannot identify numbers from 0-9	Has never been exposed to mobile technology
Level 1	Can recognize (read) and write letters/ syllables	Can read (count) and write numbers (0-100)	Can receive mobile phone calls
Level 2	Can recognize and write familiar words to the candidate's daily life and social relations	Can read and write **+, -, x** and ÷ symbols; perform addition, subtraction and simple multiplication calculations	Can make mobile phone call and save contacts
Level 3	Can recognize & write relatively unfamiliar (new) words and phrases	Perform three digits addition and subtraction, two digits multiplication & one digit division calculations	Can use mobile calculator to do simple arithmetic; Can take pictures using mobiles
Level 4	Can recognize and write sentencesincluding processing & understanding	Can perform three digits multiplication & division	Receive and send short text messages using mobile
Level 5	Can recognize and write passages including processing & understanding	Can perform compound operations and solve measurement related word problems	Can browse Internet using mobile phone

3.3 Sampling design

The study had applied a multi-stage sampling method to choose the participants of the study. Accordingly, three woredas (districts) (one from each target region) were selected based on purposive sampling method in the first stage. Three kebeles(the lowest administrative division in Ethiopia) from each woreda and one IFAE center from each kebele were selected through simple random sampling method in the second stage. Finally, ten adult learners from each IFAEcenter were selected based on a combination of stratified, snowball and systematic random sampling methods for the achievement test in the third stage. The representation of sex was assured during the sample selection process. The candidates for the achievement test were deliberately chosen from among 2nd year IFAE learners or IFAE graduates because the tests were constructed to measure the competencies of the learners.

In addition, the samples for the situational analysis were drawn from populations of CLC coordinators, IFAE supervisors, IFAE facilitators' digital literacy actors or suppliers, and partnerschosen based on purposive or availability sampling methods. Furthermore, woreda education officers, woreda IFAE experts/officers, Ministry of Education (MoE) adult education unit head and experts, national IFAE Board representatives, Ethiopian-telecom, Agricultural Transformation Agency (ATA), Adult and Non-Formal Education Association in Ethiopia (ANFEAE), and *dvv International* were chosen to participate as key informants of the study through purposive sampling.

3.4 Data Analysis and Presentation of Findings

Before data analysis, editing and filtering mechanisms was done to ensure the quality of the data. Qualitative data was sorted out on the basis of rigorous content analysis technique and appropriate classification and coding was carried out. Similarly, quantitative data was edited, classified and encoded and depending on the objectives of the study and the nature of data collected, descriptive statistics were used to summarize the qualitative and quantitative data. The encoded data summarized and presented in the form of tables, graphs, and charts to enhance understanding among audiences.

IV. RESULTS AND DISCUSSION

4.1 Demographics of Adult Learners

Initially it was planned to involve a total of 90 adult learners from the three sample workers of the study (30 learners from each woreda). However, the number of sample adult learners in Ambo Woreda was reduced to 20 due to the prevalence of some social unrest in the area during the data collection. Thus, a total of 80 (88.9%) targeted adult learners were actually involved in the study and the demographic data of these participants are presented in the table below.

TABLE 4.1 Demographics of Sample Adult Learners

Item	Responses	Male		Female		Both	
		frequency	%	frequency	%	frequency	%
Age (in years)	Below 20	1	1.25	-	-	**1**	**1.25**
	20-29	-	-	28	35.0	**28**	**35**
	30-39	7	8.75	35	43.75	**42**	**52.5**
	40 & above	1	1.25	8	10.0	**9**	**11.25**
	Total	**9**	**11.25**	**71**	**88.75**	**80**	**100**
Marital status	Married	8	10	69	86.25	**77**	**96.25**
	Single	1	1.25	2	2.5	**3**	**3.75**
Level of education	2nd year IFAE	8	10.0	60	75.0	**68**	**85.0**
	IFAE complete	1	1.25	11	13.75	**12**	**15.0**
Occupation	Housewife	-	-	48	60.0	**48**	**60.0**
	Farmer	6	7.5	1	1.25	**7**	**8.75**
	Daily laborer	1	1.25	5	6.25	**6**	**7.5**
	Petty trader	-	-	16	20.0	**16**	**20.0**
	Employed with salary	2	2.5	1	1.25	**3**	**3.75**

As indicated in Table 4.1 above the overwhelming majority of adult learners (88.9%) involved in the study are female.As far as the age distribution of adult learners is concerned, 70 (87.5%) are found in the age bracket of 20-39 years. This implies that most of the participants are either in their youth or in early adulthood period, which is the primary age group targets of IFAE in Ethiopia. Moreover, almost all the participants (96.25%) are married. The table further depicts that the vast majority of adult learners (85%) are in the second (final) year of IFAE program while the remaining 15% are IFAE completers. With regard to occupation, the majority of participants (60%) happened to be housewives while 20% of them were petty traders.

4.2 Mobile Possession

The other items presented to adult learners were related to possession type, utilization and maintenance of mobile phones. The corresponding responses of participants are presented below.

TABLE 4.2 Mobile Possessions and Utilization

Item	Responses	Male		Female		Both	
		f	%	f	%	f	%
Possession of mobile	Yes	9	11.25	49	61.25	**58**	**72.5**
	No	-		22	27.5	**22**	**27.5**
Type of mobile possessed (for those who said 'yes')	Ordinary mobile	9	15.5	49	84.5	**58**	**100**
	Smart phone	-	-	-	-	**-**	**-**
	Tablet	-	-	-	-	**-**	**-**
Purpose of mobile utilization (for those who have ever possessed mobile)	Making & receiving calls	9	13.25	56	86.2	**65**	**100**
	Text messaging	1	1.25	4	5	**5**	**6.25**
	Taking pictures	2	2.5	10	12.5	**12**	**15**
	Making calculations	2	2.5	14	17.5	**16**	**20**
	Browsing Internet	-	-	-		**-**	**-**
	Listening radio	7	8.75	25	31.25	**32**	**40**
	Torching/battery lighting	8	10	35	43.75	**43**	**53.75**
	listening spiritual songs	3	3.75	5	6.25	**8**	**10**
Who repairs mobile?	No one	5	6.25	25	31.25	**30**	**37.5**
	Technician available in the nearby	4	5.0	46	57.5	**50**	**62.5**

As indicated in the Table above, over 70% of adult learners possess ordinary (i.e. non-smart) mobile handsets for receiving and making calls. The findings also depict that 53.75%and 40.0% of mobile phone users use their devices as a torch (battery lighting) and listening to FM radio, respectively. On the contrary, the percentage of participants who use their mobile phones for literacy and numeracy related purposes (text messaging, making calculations) is quite low, and none of the respondents uses their mobile phones for browsing the internet.

As far as the issue of maintenance is concerned, the majority of the respondents (62.5%) responded that they seek the service of technicians in nearby towns whenever they get problems with their mobile phones.

TABLE 4.3 Readiness to participate in mobile learning if introduced

Item	Responses	Male		Female		Both	
		F	%	F	%	F	%
Willingness to participate in m-learning	Yes	9	11.25	71	88.75	80	100
	No	-		-			
	Undecided/not sure	-		-			
Subjects of interest to attend (for those who said 'yes')	Health & safety	9	11.25	71	88.75	80	100.
	Farming skills	9	11.25	53	66.25	72	90.0
	Family education	9	11.25	65	81.25	74	92.5
	Income generation & saving	9	11.25	70	87.5	79	98.0
	Protecting environment	9	11.25	65	81.25	74	92.5
	Civic & governance	4	5.0	55	68.75	59	73.75
	Banking & finance	8	10.0	70	87.5	78	97.5
	Business & entrepreneurship	8	10.0	62	77.5	70	87.5
	Marketing & sales	7	8.75	50	62.5	57	71.25
	Social networking	6	7.5	52	65.0	58	72.5
Possible factors preventing m-learning by adults	Family burden	1	1.25	25	31.75	26	32.5
	Lack of technology access	7	8.75	65	81.25	72	90.0
	Lack of facilitator support	2	2.5	21	26.25	23	28.75
	Lack of learner interest	1	1.25	10	12.5	11	13.75
	Power interruption	9	11.25	71	88.75	80	100
	Networking problem	7	8.75	71	88.75	78	97.5
	Absence of technology maintenance/repairing expert	7	8.75	44	55.0	51	63.75

As Table 4.3 vividly shows, adult learners are generally found to be positive about the introduction of mobile literacy and all of them (100%) expressed their willingness to take part in it. As to the subject areas of interest, the responses of the participants can be grouped in two categories. The highest rated category includes subjects such as health and safety (100%), income generating and saving (98%), Banking and Finance (97.5%), family education (92.5%) and Farming skills (90.0%). The second category of subjects include business and entrepreneurship (87.5%), civic and Governance (73.75 %), social networking (72.5%) and Marketing and sales (71.25 %). In brief, it may be said that the subject areas of interest expressed by adult learners are in harmony with the general curriculum framework of the prevailing IFAE program.

Concerning factors that may hinder the introduction of mobile literacy, sample adult learners identified power interruption (100%), networking problem (97.5%), lack of technological access (90%) and problem of maintenance of technological devices as major obstacles to the smooth operation of the program. Family burden and lack of facilitator support are the other minor problems identified by the respondents.

4.3 Reading, Writing, Numeracy and Digital Competency Assessments

Reading, Writing, Numeracy and Digital competencies encompasses a broad range of skills, background knowledge, certain attitudes and dispositions. Hence, an attempt has been done to compile the data collected from the field, summarize for each competency area based on the following specimen, and discuss each of them at sufficient length. Each competency area was assessed based on the following proficiency rating.

- **A= scoring 75-100%**:- These are learners who scores (75 – 100%) on the proficiency testand are high **achievers.**
- **B= scoring 50-74%:-** areparticipants whose proficiency test scores is satisfactory and transfer to the next level.
- **C= scoring 0-49%:-** These are low achievers whose proficiency test score is below satisfactory and will stay on the same level.

Accordingly, the results and corresponding discussions of the literacy, numeracy and digital assessments are presented below.

4.3.1 Reading Competency

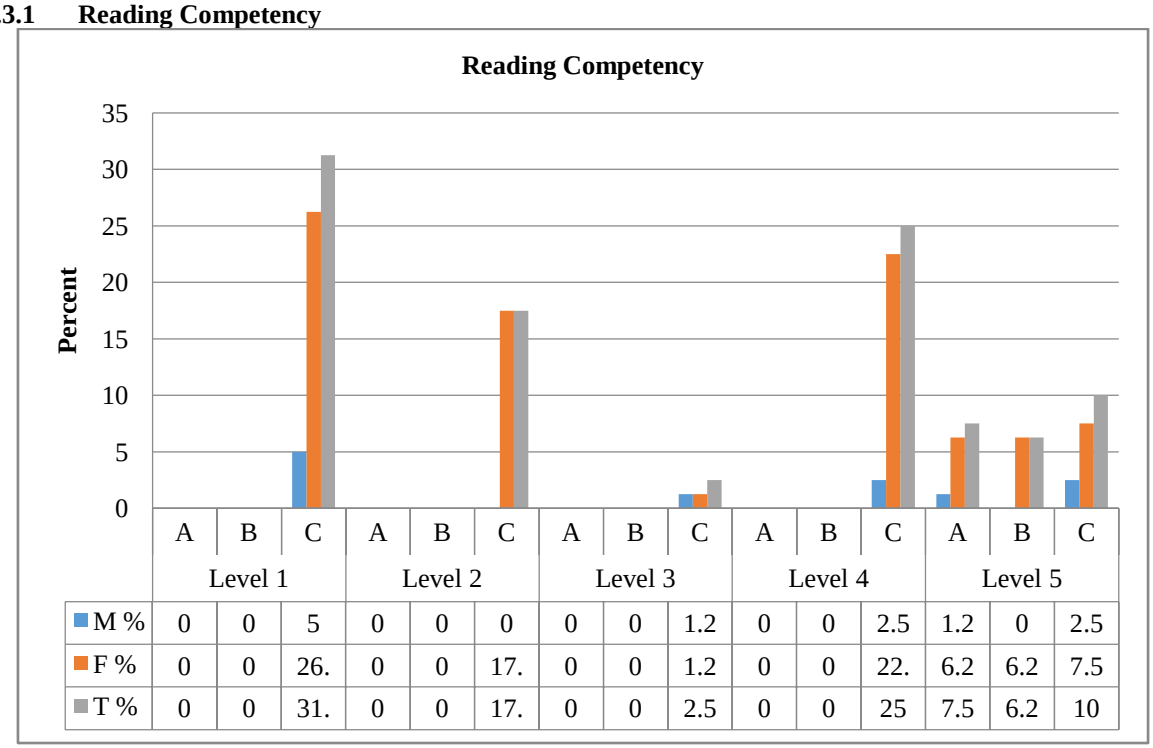

FIGURE 4.1 Reading competency results

The number of participants who were promoted to or detained in each level is summarized on the table below

	Competency level				
Result in each level	**Level I**	**Level II**	**Level III**	**Level IV**	**Level V**
Transferred	100%	68.9%	51.4%	48.9%	46.4%
Not transferred	31.1%	17.5%	2.5%	13.8	

Among 80 participants took part in the reading skill proficiency test. As shown on Figure4.1, 31.3% of the participants had scored "C" (below satisfactory) and stayed on level I while the remainder of learners (68.9%) were promoted to level II. Among the learners transferred to level II, 51.4% scored satisfactorily in the reading proficiency test and they subsequently sat for the level III test. The remaining, 17.5% achieved "C" score on the proficiency test prepared for level II and stayed there. From those who sat for the level III reading proficiency test, 48.9% of them were transferred to level IV, while just a few (2.5%) of the participants scored below satisfactory and stayed at level III. Among those who sat for level IV reading proficiency test, about 46.4% of the participants scored sufficiently on the reading proficiency test and became eligible for proficiency test prepared for level V. On the contrary, 13.8% of the participants scored below satisfactory on reading proficiency and stayed at level IV.

The finding revealed that, half (51.1%) of the participants were found at level I and II; that means their reading proficiency skill was poor and restricted to reading letters or alphabets only. On the other hand, some (48.9%) of participants were found at level IV and V. This implies that they are able to read sentences and paragraphs with understanding.

4.3.2 Writing Competency

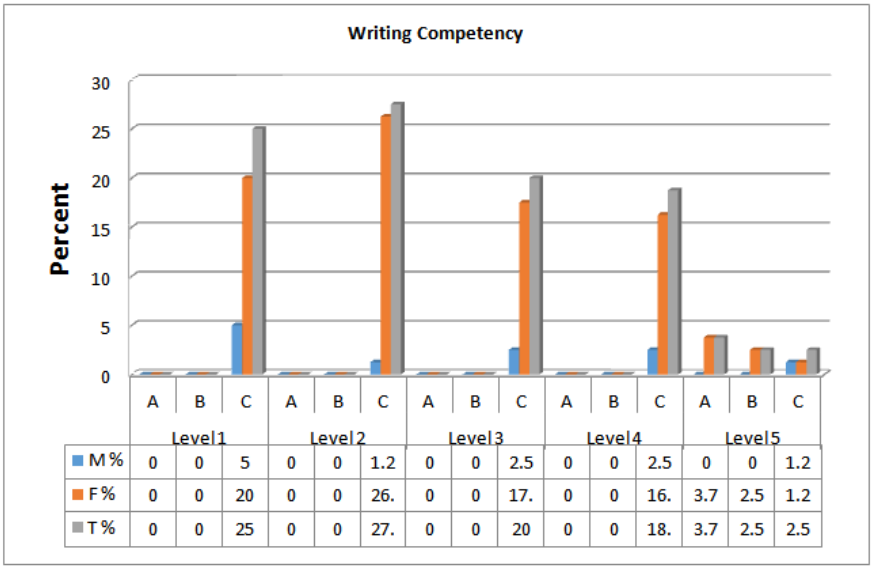

FIGURE4.2. Writing competency Results

Result in each level	Level I	Level II	Level III	Level IV	Level V
Transferred	100%	75%	57.5%	37.5%	18.7
Not transferred	25%	17.5	20%	18.8%	

With regard to the writing competency, the majority (75%) of the respondents completed the proficiency test prepared for level I and were eligible for the next level, while a quarter (25%) of the participants scored "C" (below satisfactory), and their writing proficiency didn't allow them to sat for the next level test. Among those who participated on the writing proficiency test, more than half (57.5%) of the learners successfully completed the proficiency test and sat for the level III test, while 17.5% of them scored below satisfactory and stayed at level II. In the meantime, 37.5% of the participants successfully completed the writing proficiency test and became eligible for level IV where as 20 % of them scored below satisfactory and 18.7% transferred to level V having a skill of writing meaningful paragraph.

The finding shows that, the majority (62.5%) of the learners were at Level I, II and III. This implies that their writing skill was limited on writing letters and words only, where as 37.5% of the learners were at Level IV and V and were able to convey written messages.

4.3.3 Numeracy Competency

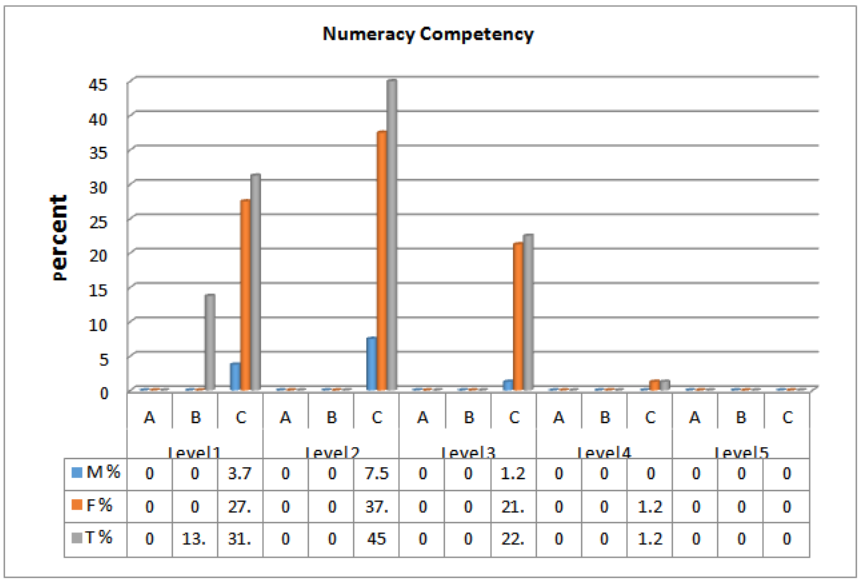

FIGURE4. 3. Numeracy Competency Result

Result in each level	Level I	Level II	Level III	Level IV	Level V
Transferred	100%	68.7%	37.4%	14.9%	-
Not transferred	31.3%	31.3%	22.5%	1.25%	-

As far as the numeracy competency is concerned, the majority (68.7%) of the learners who sat for level I numeracy competency test successfully completed and transferred to level II test while 31.3% of the learners scored below satisfactory and stayed on level I. In the same fashion, from those who sat for numeracy competency test 37.4% of the learners achieved a good performance on the proficiency test prepared for level II and transferred for the next level while 31.3% of them scored below satisfactory and stayed on level II. Among those who sat for level III numeracy proficiency test, a few (14.9%) of the learners successfully passed the proficiency test, while 22.5% of them scored below satisfactory and couldn't transfer to the next level (level IV).

Thus, the findings depicted that, the majority (62.6%)of the participants were found at level I and II and therefore their numeracy skill was found to be poor limited to counting numbers and able to compute simple addition and subtraction of two digit numbers only. On the contrary, about 37.4% of the learners were at level III and IV and had good numeracy skill that enables them to compute mathematical operations.

4.3.4 Digital Competency

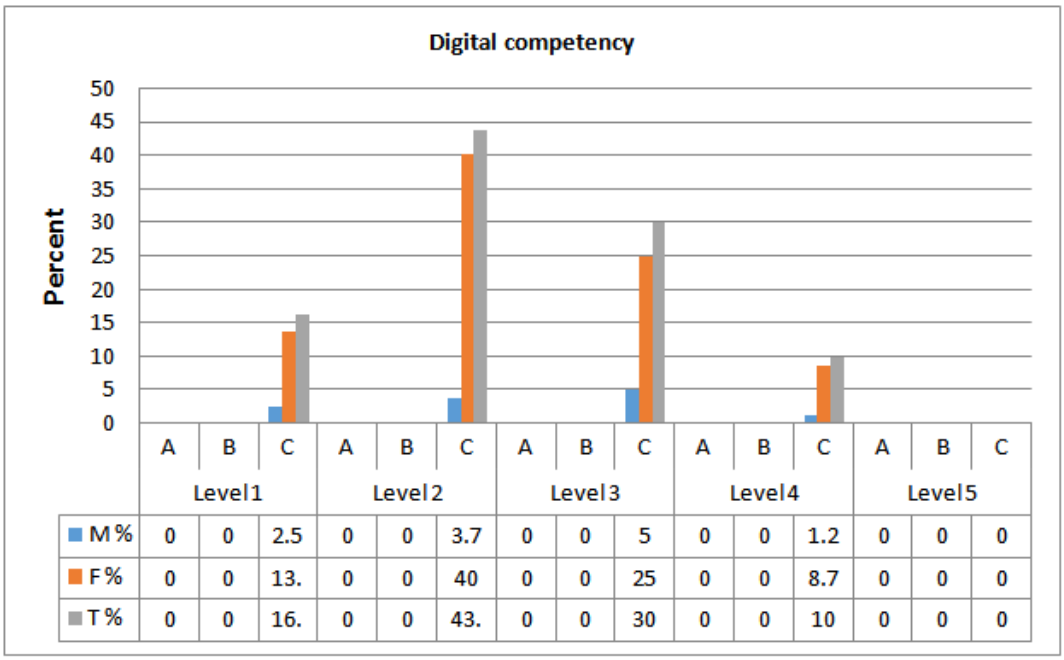

FIGURE 4.4. Competency of Digital Literacy

Result in each level	Level I	Level II	Level III	Level IV	Level V
Transferred	100%	83.7%	39.9%	9.9%	-
Not transferred	16.3%	43.8%	30%	-	-

As shown on the above table and figure, from those who sat for digital literacy proficiency test, the majority (83.7%) of the learners successfully performed the test and became eligible for the next level test while 16.3% of them scored below satisfactory and stayed on level I. Among those who sat for level II proficiency test, 39.9% of the participants performed successfully and transferred to level III. Similarly, from those who sat for digital literacy proficiency test, few (9.9%) of the learners passed the test and transferred to level IV, while most (30%) of the participants couldn't perform the proficiency test prepared for level III.

The finding reveals that, majority (60.1%) of the learners were at levels I and II, while a reasonable number (39.9%) of the participants were at levels III and IV. This implies that the majority of the learners use their mobile phones to receive and make calls only.

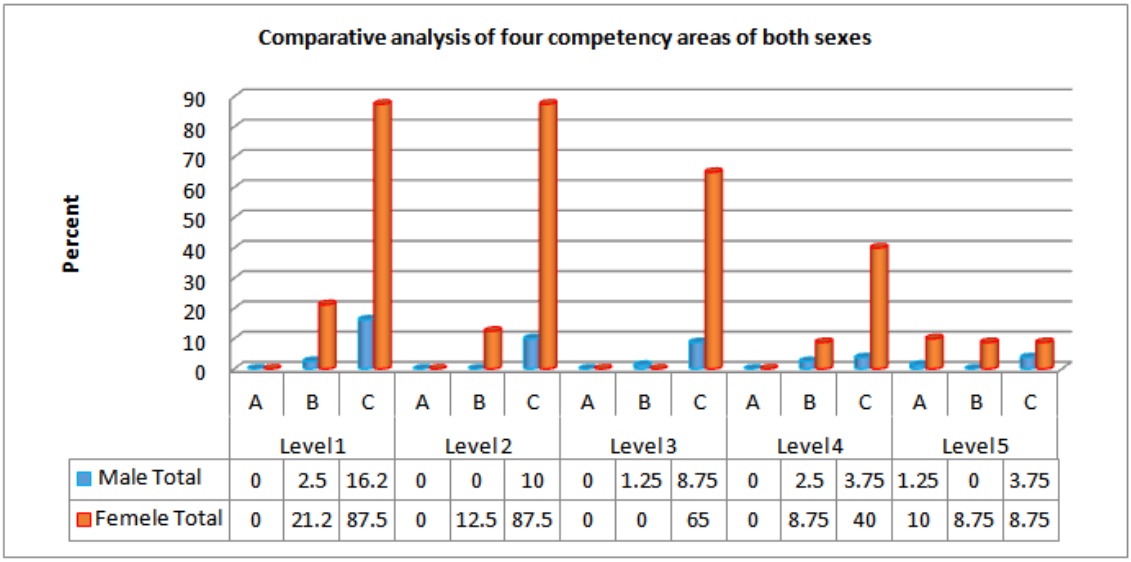

Figure 4.5 Comparative analysis of the performance in four competency areas of both sexes

Figure 4.7 above depicts that male learners showed better performance on reading and writing competencies than female learners did, whereas female learners performed better than male learners on numeracy did. With regard to digital competency, both learners have almost equivalent levels competency.

4.4 Mobile Literacy Situation Analysis

Additional primary sources of data for the situational analysis of mobile literacy were obtained from IFAE experts, facilitators, supervisors and learning center coordinators who were selected via purposive sampling techniques. Thus, in this section, the responses made by these people to the questionnaire prepared for the purpose were presented and analyzed.

4.4.1 Demographics

TABLE 4.4.1a Respondents Demographic characteristics of IFAE Expert

Item	Responses	Male		Female		Both	
		F	%	F	%	F	%
Age (in years)	20-29	8	19.5	12	29.3	20	48.8
	30-39	4	9.8	2	4.9	6	14.6
	40-49	10	24.4	1	2.4	11	26.8
	50-59	4	9.8	-	-	4	9.8
Marital status	Married	21	51.2	12	29.3	33	80.5
	Single	5	12.2	3	7.3	8	19.5
Highest level of education	Secondary education complete	-	-	4	9.8	4	9.8
	TTI/certificate	-	-	3	7.3	3	7.3
	Diploma	7	17.1	6	14.6	13	31.7
	Bachelor Degree	18	43.9	2	4.9	20	48.8
	Master's Degree	1	2.4	-	-	1	2.4
Occupation	Woreda IFAE expert	5	12.2	2	4.9	7	17.1
	Facilitator	8	19.5	16	39.0	24	58.5
	Supervisor/principal	6	14.6	1	2.4	7	17.1
	Other (specify) Health extension or Development agents	2	4.9	-	-	2	4.9

As Table 4.4.1a above depicts a total of 41 respondents 26 (63.4%) male and 15 (36.6%) female) participated in the study. Of this 80.5 % are married while the remaining 19.5% are single. As far as their educational level is concerned nearly half of them (48.4%) have their first Degree while 31.7% are diploma graduates.

Nearly 2/3 (63.4%) of the respondents are found in the 20-39 age bracket and hence are likely to be easily motivated to be trained and apply mobile technology in advancing literacy. With regard to the occupation of the respondents Table 4.4.1a depicts that more than half of them (58.5%) were facilitators and 34.2% were

woreda IFAE experts or supervisors. this shows that most of the respondents are legitimate sources of information for the base survey in question.

TABLE 4.4.1b Experts Role and service in IFAE implementation

S N	Served as	Duration of service					
		Below 2 years		2-5 years		Above 5 years	
		F	%	F	%	F	%
1	A master trainer	1	2.4	4	9.8	-	-
2	A facilitator (DA, HEW, teacher, etc)	6	14.6	11	26.8	6	14.6
3	Community organizer	-	-	1	2.4	-	-
4	Supervisor	2	4.9	4	9.8	7	17.1
5	CLC coordinator	-	-	-	-	-	-
6	Business/life skill adviser	3	7.3	-	-	1	2.4

Table 4.4.1b depicts the role and service of people who participated in the implementation of the IFAE program. Accordingly, 11 (26.8%) IFAE facilitators have 2-5 year service, 6 (14.6%) above five years and 6 (14.6%) below two year service. Supervisors, 7 (17.1%) have more than five year, 4 (9.8%) 2-5 year and 2 (4.9%) have below two year service. Similarly, 4 (9.8%) and 1 (2.4%) master trainers have 2-5 and below two year service respectively.

4.4.2 Technology Possession and Utilization

TABLE 4.4.2a Technological access and proficiency level of expertise

Type of technology	Level of proficiency							
	Non-user		Beginner		Proficient		Advanced	
	F	%	F	%	F	%	F	%
Use of mobile & related technology (as a whole)	-	-	15	36.6	14	34.1	2	4.9
Lap top	15	36.6	15	36.6	6	14.6	1	2.4
Desktop	11	26.8	16	39	6	14.6	1	2.4
Notebook/tablet	26	63.4	1	2.4	4	9.8	3	7.3
IPOD/music player	27	65.9	1	2.4	1	2.4	-	-
Cell phone (calls & texting)	1	2.4	10	24.4	17	41.5	8	19.5
Smart phone (Internet, calendar, etc.)	12	29.3	12	29.3	11	28.6	-	-

As depicted in Table 4.4.2a above, the respondents were asked about the level of expertise they have had in using mobile and related technologies. Accordingly, 36.6% of them reported that they are beginners and 34.1% believed that they are proficient (have a skills of using basic computer skills). All of the respondents were found to be users of mobile phone and related technologies. This implies that all respondents were found to be functionally literate with mobile-related technologies.

On the other hand, nearly 70% of them were non users of portable music players, and tablets whereas about 1/3 of them had begun using lap top and desk top computers. When it comes to cell phone, the findings indicate that all of them were users of cell phone. Of these, 41.5% and 19.5% were proficient and advanced (broth internet) users of cell phones respectively. Moreover, 29% of respondents asserted that they have begun using a smart phone while similar percentages of them claimed that they are proficient users of the device. In general, one can infer from the above stated findings that while all the respondents were fairly acquainted with ordinary mobile phones, they were far less introduced to the more advanced devices of the technology.

4.4.3 Challenges for Mobile Assisted Learning

The study team had also tried to identify the possible barriers to successful application of m-learning in the pilot districts and/or the country at large. These are listed below:

a) Power interruption;
b) Network problem;
c) Lack of technological access and maintenance problem.
d) Lack of experience in running M-Learning in Ethiopia before
e) Lack of trained facilitators and master trainers in M-Learning
f) Lack of facilitators' motivation and commitment

g) Absence of trained coordinators in CLCs
h) Weak technical infrastructural facilities at CLCs
i) Language diversity that is not being well integrated into mobile phones and learning processes
j) Inaccessibility of mobile handsets for many adults (expensiveness of mobile apparatuses and service charges).
k) High illiteracy rate among adults.

V. CONCLUSION

The study tried to assess the status of the literacy level and the situation of literacy environment to integrate mobile technology in adult literacy program in the selected woredas of the target regions. The study had employed rigorous approaches to measure the performances of adult learners in four competency areas (reading, writing, numeracy and digital skills) and assess the situation of m-learning environment.

The findings showed that most of the adults who participated in assessment had performed moderately well in literacy and numeracy, but poorly in digital skills. It was found out that most (75%) of adults who participated in assessment (learners and key actors of IFAE combined) had possessed ordinary mobiles and they commonly use them for making and receiving calls as well as for torch lighting purposes.

VI. RECOMMENDATIONS

The study has come up with the following key recommendations in order to tackle major the possible obstacles to the implementation of *m-Learning* in Ethiopia:

1. The MoE and education departments are advised to enhance the quality of IFAE in order to enhance the learning gain on the part of their graduates. In this regard, the curriculum framework and MLC should be revised in order to incorporate the digital skills component into IFAE education sub-system. They are also advised to develop a standardized measurement system in order to certify IFAE graduates at various levels.
2. Higher learning institutes should guide the curriculum design, leaning materials development, and should follow-up, monitor, the implementation, and conduct research on the progress and impact of the mobile assisted literacy program in collaboration with governmental and non-governmental organizations.
3. A parallel intervention to m-Learning needs to be launched to alleviate the power interruption and networking problems in rural and semi-urban areas. In this regard, partnership needs to be created among the Ethiopian Telecommunications Corporation (ETC), Ethiopian Electric Power Corporation (EEPCo), development partners, private businesses/technology suppliers, and the beneficiaries to provide alternative sources of power for households and enhance network coverage in the country.
4. All concerned to increase access and affordability of technological infrastructure, services, should exert efforts and devices in rural and semi-urban communities (introduce low-cost mobiles & services). This can be possible through partnership of ETC, development partners, and private businesses. Particularly, the involvement of local technology suppliers (e.g. ETC, Tana Mobile, Techno, SMADL (a joint-venture enterprise, in Ethiopia, specializing in the manufacture and sale of communication products) is very crucial in improving access to low-cost mobiles by the adult learners.
5. Build mobile-phone enhanced literacy components within existing literacy and empowerment endeavors. This might be possible by using existing packages that have been used elsewhere, forming partnership with private sector software developers; and developing customized literacy software.
6. Learning materials need to be prepared in short and concise texts to be sent in the form of short messaging service (SMS) or voice records. Those who develop such materials need to be well trained with adult learning psychology and m-learning material design. Moreover, the material designers are also advised to pay a visit to local organizations that started similar programs like ATA, M-Birr, etc.) to benchmark their best practices and learn lessons from their challenges.
7. Link mobile phone enhanced literacy to collective efforts pursuing to improve adult's livelihoods, voice, and participation and employment opportunities.
8. Motivate and engage facilitators to develop and apply digital and literacy skills as part of cooperative, active and inquiry–based learning
9. There needs to be a regional resource person for IFAE and m-Learning. This can be chosen from instructors of adult education department at a regional college or university or a qualified adult and non-formal education expert at regional education bureau. Incentive packages should be designed in order to attract and retain a qualified master trainer.
10. Promote women's participation in mobile learning by building on existing socio-cultural norms and practices.
11. Encourage self-and/or collective learning with skills and content relevant to the learners' prior knowledge, diverse needs and expectations.

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Jemal Shanko. " Advancing Functional Adult Literacy through Mobile Technology in Ethiopia. ″ IOSR Journal of Humanities and Social Science (IOSR-JHSS). vol. 24 no. 02, 2019, pp. 09-21.