

M-Learning Transformation Framework and Strategy in Mobile Economy

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Abstract - Mobile technology is a powerful tool for driving organizational performance. Mobile creates learning opportunities including innovation, collaboration and research. For the Education sector, mobile connectivity provides an opportunity to offer new ways of teaching and learning that ultimately will improve performance and results whilst at the same time open up new opportunities for developing countries across the world. Mobile Learning is the ability to access educational resources, tools and materials at anytime from anywhere, using a mobile device. It has the true potential to create a paradigm shift in the delivery of education. The key objective of this paper is to propose a practical Mobile Learning transformation framework and strategy. To achieve the objective of the research, this paper uses both primary and secondary qualitative data to create the Mobile Learning framework and strategy. This paper also provides a conceptual guide to transforming educational organization through mobile learning organization in Mobile Economy.

Keywords - Mobile Learning, Transformation, Framework, Strategy, Mobile Economy

I. INTRODUCTION

Education is the basic factor vital for propelling the growth in economy, society, and progress in both developed and developing countries. Mobile communication devices can raise qualities of the education system in every

community; even in remote locales, enabling the population to access education without any barriers in terms of income status, time, and place. Almost one million children in emerging countries still lack access to compulsory education. This is considered a problem in developing countries. The widespread use of mobile devices can give rise to new opportunities, possibly including the access to learning resources [1]. Mobile learning or “mLearning” can bring about convenience in the delivery of contents, information, and news to learners through application of mobile communication device technology. As the technology for mobile phones has been introduced and dramatically expanded in the modern society, mLearning demonstrates the learning opportunities available through eLearning so as to impose and promote regulations on considering and designing education. Due to the limitations in screen sizes and mobile phone usage behaviors in daily life, it is required that the approach to micro data transmission that enhances the convenience for storage and utilization among users must be improved [2].

mLearning is the process that helps facilitate the access to educational contents with the abilities in building more widespread learning communities where learning activities can be adjusted to fulfill the needs of individual users. mLearning can create a learning environment under place and time limitations, enabling people to study after work or during their free time at any places. This facilitates the study of people without

causing them to lose household income or to resign from work.

Mobile phones are more commonly used and can better penetrate into all walks of life through mobile broadband network connections. This enables people to work in the absent of barriers in terms of time, place, and rapid transmission of macro data. It is forecasted by the GSMA that the number of mobile broadband connections such as 3G and 4G technologies will increase to 70% from the current proportion. Such rapid rise in number is a consequence of the decreasing trend of mobile device prices, promoting affordability among the population as well as providing more extensive coverage, even in remote locales [3].

mLearning is considered part of the eLearning ecosystem comprising all the learning and teaching models relying on electronic media. However, mLearning can transcend limitations on materials and methods of learning and teaching through utilization mobile devices such as smartphones, smart devices, and laptops as well as can carry out learning and teaching activities at any time and places. This is very vital for developing countries in that it can promote the leapfrog growth of the country in every aspect if the plan is successfully implemented and undertaken.

The mLearning content is different from other general forms of news and information. It can be adjusted to be appropriate for individual users so as to multiply new skills and knowledge. Therefore, the process of mLearning should enable learners to fulfill the learning objectives specific to their requirements and gain the most benefit from learning. Accordingly, there should be some flexibility in reformation and applicable strategies so that the transformation into the mLearning system will be successful. The important issue to be focused on is how the framework encouraging transformation into mLearning should be, so that it can bring about success.

II. MLEARNING EMPOWERING PEOPLE AND SOCIETY

There are rapid technological changes in the modern world such as high-speed broadband networks, more utilization of smartphones and other communication devices. It is expected that mobile broadband connections will have increased to 70% of the overall global Internet connections by 2020; 40% higher than that of 2014. Nowadays, the utilization rate of smartphones in developed countries accounts for 60% of the overall connections whereas the utilization rate of smartphones in developing countries is propelled by easily available devices. This affects the number of smartphone utilization to have been higher by 2.9 billion by 2020 [3].

Education is a vital propellant for economy. The report of UNESCO points out that every 1 USD invested can promote the economic to grow by 10 – 15 USD [4]. If the reading skill of low-income students was improved, around 171 people would be able to move out of poverty. This indicates that education results in the reduction of poverty by 12 percent a year, implying that education can give rise to the GDP growth rate of 0.37% [4].

Mobile phones make the utilization of educational applications become more beneficial because they bring about new methods of communication among teachers, learners, and groups of learners. Moreover, they can provide more benefits through utilization of social networks, innovations in games, new technologies, and mobile phone content creators in order to exchange information and knowledge as well as provide millions of children and people who are not enrolled in school with new platforms. There is a research revealing that there will be around 180 million students using mobile phones for educational purposes in the next 5 years [5].

The acceleration factor that increases the need for mobile learning utilization is the expansion of 3G/ 4G networks, followed by the sharp increase in sales volume of

smartphones and tablets. The most vital trend for propelling mLearning in education sector is the application of tablets in schools or educational institutes in several countries, though it is limited in some small areas. The governments of several countries have launched national projects to promote utilization of tablets in school, and several other countries are trying to promote more extensive coverage [6] as shown by table I.

**TABLE I
TOP FIFTEEN GLOBAL TABLET PLANNED
DEPLOYMENTS IN SCHOOL SYSTEMS AS
OF AUGUST 2013 [6]**

Area of Expertise	Numbers
India	20,000,000
Egypt	20,000,000
Turkey	10,600,000
Kenya	10,000,000
South Korea	9,700,000
Thailand	5,000,000
Ukraine	3,500,000
The United Kingdom	1,800,000
Rwanda	1,000,000
Brazil	900,000
Los Angeles Unified School District (USA)	645,000
Malaysia	540,000
Columbia	500,000
Lebanon	400,000
Jamaica	400,000

According to the report on mobile learning produced by Ambient Insight, it is found that mobile learning generated products and services worth 5.3 billion USD worldwide in 2012. It has been able to grow by 18.2% yearly and will make the total income to have been increased to 12.2 billion USD by 2017 [6].

Education is the key for future growth and mobile learning is going to create digital contents and electronic resources, bringing about variety in terms of learners and teachers. The utilization of smartphones and means of online penetration engage everyone in the world economy. Other than facilitate the population of developing countries in accessing information sources belonging to developed countries, the 21st century skills can also provide learners with new chances,

encouraging both the learners and teachers to gain the most benefits in the age of digital revolution [7].

III. RESEARCH METHODOLOGY

The goal of this paper is to propose a mLearning transformation framework and strategy in Mobile Economy. This paper adopts the in-depth interview approach to explore the research objective. In this research, source information is from academic papers, business reports and interview with subject matter experts on ICT technology, economic, social science, and education.

The research framework of this paper is illustrated in Fig. 1.

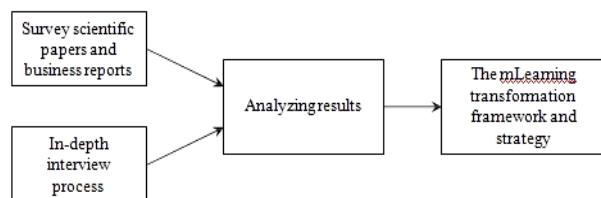


Fig 1. Research Framework

The respondent profiles of our subject matter experts are shown in Table II. We classified subject matter experts into four categories depending on their area of expertise in ICT Technology, Economics, Social Science and Education. The total number of subject matter experts or respondents is 12 with 3 from each key focus area.

**TABLE II
INTERVIEWING EXPERTS AND KEY FOCUS**

Area of Expertise	Numbers
ICT Technology	3
Economic	3
Social Science	3
Education	3

Further once qualitative data is compiled from secondary research and primary research (interviews with subject matter experts), we will analyze the results and use the qualitative data analysis to derive mLearning transformation framework and provide

recommendations for its practical use.

IV. RESULT AND DISCUSSION

After the research methodologies in section III have been adopted, the research findings can be concluded as follows:

A. Strategies

1. When there is the development into mLearning, it should be clarified that mLearning differs from eLearning. Therefore, the contents must be adjusted appropriately for individual means of mLearning utilization.

2. In order to successfully execute the strategies for learning processes, it should be realized that learners are the main focus. Different learners will react differently with learning via digital tools, depending on various means that the learning contents are featured. In order to develop mLearning contents, developers have to place major emphasis on learners. This requires the strategies for improving the means of content feature to extensively cover both the tech-savvy and less tech-savvy means of learning.

3. Recommendations about Mobile Learning for Quality Education and Social Inclusion UNESCO Institute for Information in Education (IITE) Policy Brief, November 2010 are as follows:

- The value of additional learning should be realized, such as other means of learning apart from those belong to compulsory education or learning from daily activities. It is required that the learners must be encouraged to realize the benefits that the society will gain from such learning.

- The widespread use of mobile learning will encourage underprivileged people in education to become the valuable resources for teaching and learning through using mobile phone technologies in sharing and exchanging knowledge and proficiency.

- There should be the establishment of research funds for mobile learning, especially

for long-term teaching. This includes large-scale expansion of education where the target should be focused on and the appropriate expansion boundary should be determined.

- There should be collaboration among educational institutions to develop the policies on mobile learning so as to be practical.

- Provide teachers with training in order to instill realization, build confidence, and share new skills and knowledge for improving the existing curricular.

- The public sector should have capital for supporting and developing the innovations so as to develop mLearning for underprivileged people.

- There should be collaboration with telecommunications regulators and operators in order to achieve mobile phone and Internet penetration at appropriate prices.

- There should be collaboration with producers of learning media so as to develop business models to be more flexible, cheaper, freely accessible, and applicable on mobile devices.

B. Recommendations for Governments and Regulators

The factors stimulating the emergence of mLearning are [8]:

1. Developing policy supportive of mLearning: It is accepted in several countries that too high costs of mobile internet penetration and inadequate networks for mobile Internet connections are considered barriers to mLearning. The government and regulate sectors, therefore, must play a pivotal role in seeking appropriate ways to save costs of mobile Internet penetration. This gives rise to the efficient approach to spectrum management that places main emphasis on long-term social benefits together with the expansion and support of infrastructure sharing that enable people in rural areas to make connections with school, etc.

The policies and strategies of the government and telecom regulators play a significant role in bringing about mLearning and improving the efficiency in mLearning services such as national broadband strategies, digital economy policies, and the policies on allocation of digital dividend spectrum in the 700 MHz for telecommunications in several countries which will give rise to the expansion of mobile phone networks to rural and remote areas, while carrying lower costs of networks.

Furthermore, the agency that imposes policies and enforces educational regulations must play a pivotal role in applying mLearning in school and be able to integrate mLearning into classroom learning activities.

2. Developing a committed ecosystem: Mobile learning must rely on collaboration between industries. This refers to the collaboration among non-profit agencies, charitable organizations, international agencies, the government, business sectors, research institutes, educational institutions, and the popular sector in order to bring about collective impacts. Each of individual organizations can produce different results: the learner who is not technological expertise and the technological expertise who is not a learner. Hence, there should be the association to promote a better understanding in different telecommunications industries and education sectors. The use of inter-language for communication under a common objective is the foundation that gives rise to mLearning.

The attempt to promote cooperation in the national, regional, and global levels as well as the share and exchange of guidelines, the compilation of contents are considered the factors that create large-size learning resources, accelerating the emergence and wider expansion of mLearning in the ecosystem.

3. Increased role of the information communications technology sector: The ICT industry sector is the pivot of the mLearning ecosystem. The existence of powerful ICT leaders will enhance realization, utilization,

capability expansion, and financial sustainability. Besides, the ICT sector also takes part in seeking cooperation in the community resulting in economies of scale, innovation development, and competition. The operators will play a major role in promoting and expanding utilization and service provision of mLearning. Based on this, the users have to be aware of the service they are using and how the mobile phone network operators can facilitate them. In addition, the ICT sector can also embed the mLearning in the cloud service platform. This will provide learners, teachers, application developers, and mobile phone operators with a large complete education system.

In the meantime, the ICT industry sector should closely cooperate with the public sector to bring about the adaptive application of infrastructure in rural areas, efficient school connections, and the attempt to create correspondence among device producers so as to lower production costs, of smartphones and tablets in particular.

Operators, telecommunications service providers, mobile device producers have to collaborate with legal agencies and regulators to impose policies and mLearning designs of interest, especially the mLearning for learners in remote locales and low-income people at appropriate prices. Therefore, the ICT and telecommunications sectors have to come up with the methods to collect profits and social benefits which can both generate income and raise the living standard of the population. This will make the underprivileged people worldwide gain benefits from the attempt to utilize mLearning.

This particular research provides recommendations for the process of converting a learner who has never used or heard of mobile learning into the learner who habitually uses mobile learning as demonstrated by fig. 2.

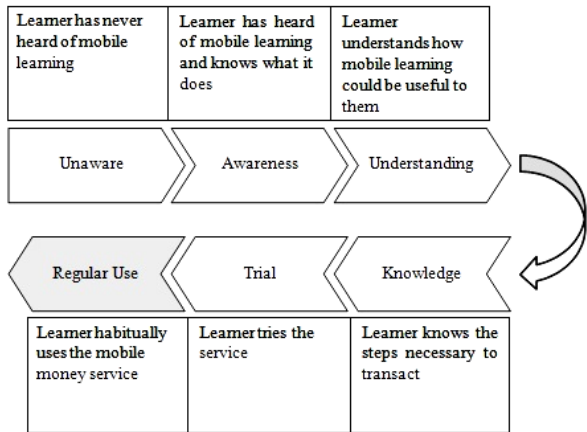


Fig 2. The Process of Converting a Learner who had never Heard of Mobile Learning to one that Habitually uses the Mobile Learning Service

C. Recommendations for the Transformation

After analyzing and studying effects, this particular research features the transformation model of mLearning on the basis of William B. Rouse’s theory of enterprise transformation [9] as illustrated by Fig. 3.

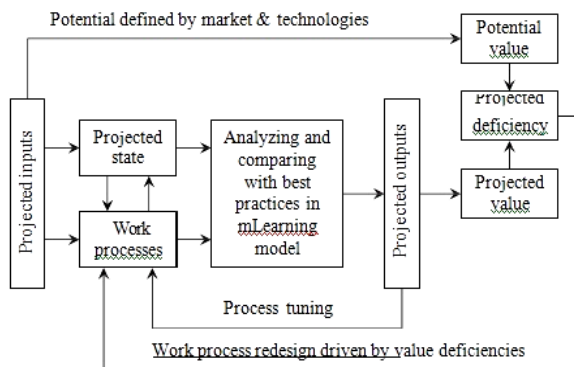


Fig 3. The mLearning Transformation Model

From fig. 3, it is indicated that the transformation of education into mLearning requires comparative analysis, examination, and conversion of working processes. During the process of examination, the conversion method which leads to future consequences will be considered. Such possible consequences are caused from impact and defect assessment in order to facilitate the adjustment of processes and means of working, including allocation of the resources for mLearning.

V. CONCLUSION

Mobile phones bring about positive effects through utilization of learning applications. This is considered the new mean of communication among teachers, students, and groups of learners. Moreover, it can also make use of social networks, innovations, new technologies, and content developers on mobile phones in order to share and exchange data and knowledge. This particular research features the practical framework and strategies for designing guidelines for mobile learning. The results and recommendations of this particular research will give rise to the creation of educational models for mobile phone technology. This requires the cooperation among the public sector: the government, the regulators: the private and education sectors in the integration of educational systems so as to fulfill the goal of mLearning.

REFERENCES

(Arranged in the order of citation in the same fashion as the case of Footnotes.)

- [1] Baker, A., Dede, C., and Evans, J. “The 8 Essentials for Mobile Learning Success in Education”. Qualcomm Wireless Reach Report: <<https://www.qualcomm.com/media/documents/files/the-8-essentials-for-mobile-learning-success-in-education.pdf>>.
- [2] Transforming learning through mEducation. GSMA Report, McKinsey & Company: <<http://www.gsma.com/connectedliving/wpcontent/uploads/2012/04/gsmamckinseytransforminglearningthroughmeducation.pdf>>.
- [3] GSMA. (2015). “Mobile Economy 2015 GSMA”.
- [4] UNESCO. (2012). “Education for All Global Monitoring Report”.
- [5] World Economic Forum. (2013). “Accelerating the Adoption of mLearning: A Call for Collective and Collaborative Action”.

- [6] Ambient Insight's 2012-2017 Worldwide Mobile Learning Market Forecast: Premium Edition: <<http://www.ambientinsight.com/Resources/Documents/Ambient-Insight-2012-2017-Worldwide-Mobile-Learning-Market-Executive-Overview.pdf>>.
- [7] Darrell, M.W. "The State of the Mobile Economy, 2014: Its Impact and Future". Center for Technology Innovation at Brookings, Sept 2014: <http://www.brookings.edu/~media/research/files/papers/2014/09/10-state-of-mobile-economy-west/state-of-mobile-economy_v13.pdf>.
- [8] Accelerating the Adoption of mLearning: A Call for Collective and Collaborative Action. "World Economic Forum's Global Agenda Council on ICT". <http://www3.weforum.org/docs/WEF_GAC_AcceleratingAdoptionMLearning_2012.pdf>.
- [9] William, B.R. (2005). "A Theory of Enterprise Transformation". *Systems Engineering*, Vol. 8, No. 4.