

# Actor-Network Theory Approach Using M-Learning Technologies in the Public Senior High School as Pedagogy

Mamerto T. GONEDA <sup>a\*</sup>, Francis Arlando L. ATIENZA <sup>b</sup>, John Paul P. MIRANDA <sup>c</sup> Rolando R. FAJARDO <sup>d</sup>, Dominic C. CABAUTAN <sup>e</sup>

<sup>a</sup> *Claro M. Recto High School, DepEd Manila, University of the East – Manila, Philippines*

<sup>b</sup> *Pamantasan ng Lungsod ng Manila, University of the East – Manila, Philippines*

<sup>c</sup> *Don Honorio Ventura State University, University of the East – Manila, Philippines*

<sup>d</sup> *Far Eastern University, University of the East - Manila, Philippines*

<sup>e</sup> *Isabela State University, University of the East - Manila, Philippines*

<sup>a</sup> [mamerto.goneda001@deped.gov.ph](mailto:mamerto.goneda001@deped.gov.ph), <sup>b</sup> [fcatiENZA@yahoo.com](mailto:fcatiENZA@yahoo.com), <sup>c</sup> [johnpaul.p.miranda@gmail.com](mailto:johnpaul.p.miranda@gmail.com),  
<sup>d</sup> [rfajardo@feu.edu.ph](mailto:rfajardo@feu.edu.ph), <sup>e</sup> [d15cabautan@gmail.com](mailto:d15cabautan@gmail.com)

**Abstract:** The researchers adopted the phases of Actor-Network Theory approach for the public senior high school teachers with the use of M-Learning technologies as pedagogy since most of them lack access in using different learning materials and textbooks. With this, the teachers find other ways on how to provide learning materials for their students. The study used free and open source educational software to support and sustain the needs of the students and one of the M-learning open source tools is Edmodo. Also, the teacher supplements the needs of the learners with the use of some technological devices such as mobile phone, tablet and desktop computers. The result of the study showed that it is moderately accepted in terms of using the free and open source Edmodo application. The respondents moderately accepted the use of such devices as an educational pedagogical strategy. Moreover, the satisfaction of ANT approach with the use of the m-learning technologies in the public senior high school students in terms of m-learning materials, activities and assessment was highly accepted with a total mean of 4.56. Lastly, the level of agreement of ANT approach as pedagogy in terms of functionality, efficiency, usability, availability, and reliability was strongly agreed by the students.

**Keywords:** M-learning, M-technologies, Actor-Network Theory (ANT)

## 1. Introduction

Over the past years, the teaching methodology in the Philippines in public high school has evolved tremendously that is geared and focused to the very needs of our foremost clientele-the students. The teaching pedagogy, taken as an academic discipline that studies how knowledge and skills are exchanged in an educational context has taken much consideration and leads to the betterment and quality of our secondary education.

With this, a lot of researches, pedagogical enhancement and technological infusion have been used in order to uplift and sustain the quality of education in public secondary schools.

### 1.1 Statement of the Problem

This study sought to adopt the Actor-Network Theory approach using M-Learning technologies in the public senior high school as pedagogy.

Specifically, it aims to answer of the following;

- 1.1.1 What are the challenges encountered by the participants in a traditional teaching approach in providing learning to the public senior high school students?

- 1.1.2 What is the level of acceptance of ANT approach using M-Learning technologies in the public senior high school as pedagogical strategy in terms of:
  - 1.1.2.1 Software Technology,
  - 1.1.2.2 Hardware Technology?
- 1.1.3 What is the level of satisfaction of ANT approach using M-Learning technologies in the public senior high school in facilitating the performance of the learners in terms of:
  - 1.1.3.1 M-learning materials;
  - 1.1.3.2 M-learning activities; and
  - 1.1.3.3 M-learning assessment?
- 1.1.4 What is the level of agreement of ANT approach using M-Learning technologies in the public senior high school as pedagogical strategy in terms of:
  - 1.1.4.1 Functionality;
  - 1.1.4.2 Efficiency;
  - 1.1.4.3 Usability;
  - 1.1.4.4 Availability;
  - 1.1.4.5 Reliability?

## *1.2 Actor-Network Theory*

Adopting actor-network theory in the Philippines education system has a purpose. The main goal of the education in the Philippines is to give the best quality education for all the learners. Carroll et. al. 2012 stated that the fundamental aim of ANT is to explore how network are built or assembled and maintained to achieve a specific objective. ANT provides the ability to uncover the chain of actions or influences from various actors which are carried out to deliver a specific action and outcome.

Actor-Network Theory (ANT) is a part of social theory that highlights on relationship of actors. Social theory is seen as a translator and analyzer tool for researcher to discover the cause and solution of a problem. These theories also help researcher to variously explain and analyze how social action, social processes, and social structures work (Salamat et al. 2011, VI-87). Also, these theories may help the different public senior high school how to support the needs of the actors in the network.

Fenwick and Edwards' (2010) book on Actor-Network Theory in Education suggested that ANT could provide a useful 'lens' to look through at the literature under investigation. Parallels can be drawn to Fenwick and Edwards' account of Bigum's (1998) classifications of the discourses used to position information technologies as technologies for learning. Using the mobile technologies in the education might help to lessen the problem of the teachers and students in the school. Adopting the phases of ANT approach (McBride 2000) may guide the network the implementation of ANT with integration of the technology in the school.

The difference between ANT and other network theories is that in the former, actors and entities can be either human or nonhuman. Their properties are also being dependent on their relationship in a network. ANT treats all elements of the system equally in understanding the relationship among actors (Salamat et al. 2011, VI-84)

Bigum's analysis draws on the perspective of ANT. This theoretical framework uses "the metaphor of heterogeneous network, a way of suggesting that society, organization, agents and machines are all effects generated in patterned networks of diverse (not simply human) materials" (Law 1992, 380).

ANT's main feature is it focuses on inanimate entities and their effect on social processes. An actor is thus defined as the "source of an action regardless of its status as a human or non-human", this is a radical notion in that it contests that inanimate things (e.g. such as technology) can also have agency (Prout 1996 and Law 2002). An actor can however only act in combination with other actors and in constellations that give the actor the possibility to act (Law 2002). Thus, inherent to ANT is a move away from the idea that technology impacts on humans as an external force, to the view that technology emerged from social interests (e.g. economic, professional) and that it thus has the potential to shape social interaction (Prout 1996).

## 2. Methods

### 2.1 Research Methodology

The research method used in this study was descriptive method where data collection was done through survey questionnaire and interview. The respondents answered questions diligently based from the use of M-Learning tools inside the classroom. The questionnaire also asked respondents on their experience on the usage of this technology in different platforms like mobile phones, tablets, and laptops.

### 2.2 Research Instruments

The following instruments were used by the researchers:

#### 2.2.1 Survey Questionnaire

Below is the Likert scale that the researchers used in the questionnaire of this study “Actor-Network Theory Approach Using M-Learning Technologies in the Public Senior High School as Pedagogy.”

Table 1

*Level of acceptance of the respondents using m-learning technologies in the public senior high school with Actor-Network Theory as pedagogy.*

| Likert Scale | Range       | Verbal Interpretation |
|--------------|-------------|-----------------------|
| 5            | 4.51 – 5.00 | Highly accepted       |
| 4            | 3.51 – 4.50 | Moderately accepted   |
| 3            | 2.51 – 3.50 | Accepted              |
| 2            | 1.51 – 2.50 | Minimal accepted      |
| 1            | 1.00 – 1.50 | Not accepted          |

Table 2

*Level of satisfaction of the respondents using m-learning technologies in the public senior high school in gauging the performance of the learners.*

| Likert Scale | Range       | Verbal Interpretation |
|--------------|-------------|-----------------------|
| 5            | 4.51 – 5.00 | Highly satisfied      |
| 4            | 3.51 – 4.50 | Moderately satisfied  |
| 3            | 2.51 – 3.50 | Satisfied             |
| 2            | 1.51 – 2.50 | Minimal satisfied     |
| 1            | 1.00 – 1.50 | Not satisfied         |

Table 3

*Level of agreement of the respondents using m-learning technologies in the public senior high school with Actor-Network Theory as pedagogical strategy in terms of functionality, efficiency, usability, availability, and reliability.*

| Likert Scale | Range       | Verbal Interpretation |
|--------------|-------------|-----------------------|
| 5            | 4.51 – 5.00 | Strongly agree        |
| 4            | 3.51 – 4.50 | Agree                 |
| 3            | 2.51 – 3.50 | Neutral               |
| 2            | 1.51 – 2.50 | Disagree              |
| 1            | 1.00 – 1.50 | Strongly disagree     |

### 2.3 Statistical Treatment of Data

The researchers used a measure of central tendency to obtain shorthand of the entire data and indirectly described the population where the responses were gathered. Specifically, the weighted mean was employed to determine the average value of response the respondents. The statistical formula for the weighted mean is denoted by:

$$Wm = \frac{TWF}{N}$$

Where:

Wm = Weighted mean

TWF = Total of the products of the weight multiplied by their corresponding frequencies

N = Number of rater or total frequency

### 2.4 Actor-Network Theory Approach

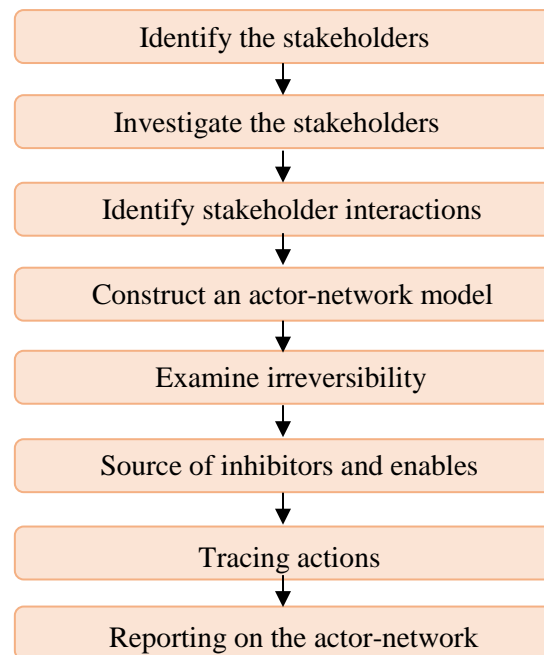


Figure 1: Phases of Adopting the ANT approach (adopted from McBride, 2000)

### 2.5 Open-Source M-Learning



Figure 3: Image of Edmodo, a free and open-source application  
(Source: [www.edmodo.com](http://www.edmodo.com))

## 2.6 M-Technologies



Figure 4: Image of m-technologies such mobile phones, tablets, laptop  
(Source: [www.google.com/search?q=mobile+technologies&tbm=isch&ved](http://www.google.com/search?q=mobile+technologies&tbm=isch&ved))

## 3. Results

There were 50 respondents who were selected to answer the survey questionnaire. 31 of them were male and 19 were female. The respondents were the senior high school teachers from the 3 selected DepEd public secondary schools within the National Capital Region which are Claro M. Recto High School, Lagro High School and Camarin High School.

In terms of technology usage profile of the respondents, the usage of the devices such as mobile phone got 96% or 48 in frequency, tablets got 56% or 28 in frequency and laptop got 34% with 17 in frequency. Therefore, the mobile phone usage ranked first and most of the teachers have been using these devices for more than 3 years with 72%, 2 to 3 years got 22% and less than 1 year for 6% only.

One of the challenges of the senior high public teachers who used traditional teaching approach was taking much time in preparing instructional materials. This resulted to 82% or 41 of them experienced the said concern. On the other hand, 68% of the teachers said that there is a limited teaching material like textbooks and other learning materials used inside the classroom. Also, 76% mentioned of spoon feeding in lecture and discussion which they really wanted to avoid. Lastly, 72% or 36 of them said they wanted to avoid teacher-centered inside the classroom.

The level of acceptance of ANT approach using m-learning technologies in the public senior high school as pedagogical strategy of the teacher resulted to moderately accepted. This means that the open-source Edmodo application for the m-learning using the devices such as mobile phone, tablets and laptops were really accepted by the respondents as a pedagogical strategy in education. The network which is the technology and devices used of the teachers contributed to good and proper learning of the students. Furthermore, the actors who were the students learned and achieved good benefits from the non-human materials.

With regards to the satisfaction felt by the public teachers, the result showed that high satisfaction was seen. The use of m-learning materials was highly satisfied with a mean score of 4.562, while the m-learning activities had a mean score of 4.435 which was moderately satisfied. The m-learning assessment had a result of total mean response of 4.524 which was highly satisfied.

Lastly, the level of agreement of the actor-network theory approach using m-learning technologies in the public senior high school as pedagogy in terms of functionality, efficiency, usability, availability and reliability has resulted to a strongly agree. The use of Edmodo application and using technology devices like mobile phone, tablets and laptops were very helpful for the teachers as their pedagogical strategy in education.

#### 4. Discussion/Conclusion

In summary, the actors or humans play a big factor in managing the non-human entities in education. The non-human entities have a big role in our education especially in the public senior high school where technology shapes the human entities that needs support, engagement and answer to the needs of the teachers and most especially the students.

The integration of technology in education as a pedagogical strategy of the teacher helped them to achieve their goal of supplementing their teaching strategy properly to their students. It is an effective strategy for the senior high teachers so that no learners will be left behind or disengaged during class lectures and discussions.

Lastly, the researchers of the study proved that using the m-technologies such as mobile phone, tablets, and laptops was highly accepted in classroom discussions. It bridged the gap of unavailable learning materials, teacher-centeredness and students non-participatory as major challenges faced by the teachers in their day-to-day chore inside the classroom.

#### 5. Recommendation

The following are the recommendations to be considered:

- a. Other open-source application can be used by the public high school teachers using the m-technologies such as mobile phone, tablets, 2n1 laptops, etc. as educational pedagogical strategy.
- b. Learners can be able to access the lesson from the teacher anytime and anywhere.
- c. The phases of adopting the ANT approach (adopted by McBride, 2000) can be used as a guide for possible implementation in primary or collegiate school setting.
- d. Future researchers will use this research as basis for future studies that will improve the study more especially in the Philippine education system both public and private schools.

#### Acknowledgements

This research was supported by our professor Dr. Rex Bringula of the University of the East, Graduate School where he gave guidance and ideas in the completion of this study. The researchers also thanked the teachers of the 3 different public secondary high school teachers for their participation in answering honestly the questionnaire where results were extracted and evaluated. Lastly, this study is also possible with the help, critique and support of fellow Doctor in Information Technology students from the University of the East.

#### References

- Bigum, C. (1998). Solutions in search of education problems: Speaking for computer in schools. *Educational Policy* 12, no, 5:595-601.
- Fenwick, T., Edwards, R. (2010). *Actor-network theory in education*. London: Routledge.
- Latour, B. (2005). *Reassembling the social: An introduction to actor-network theory*. New York, NY: Oxford University Press.
- Law, J. (1992). Notes on the theory of the actor-network: *Ordering strategy and heterogeneity*, August 1992, Vol. 5, Issue 4, pp. 379-393
- Law, J. Mol A. (2002). *Complexities – social studies of knowledge practices* Duke University Press
- Prout A. (1996). Actor-network theory, technology and medical sociology: an illustrative analysis of the metered dose inhaler. *Sociology of health and illness* 1996, 18:198-219
- Salamat, M.A.B., Hassan, S.B. (2011). *An Actor-Network Theory (ANT) approach to Malaysian e-participation framework*. 2011 International Conference on Social Science Humanity, PERD Vol. 5, ACSIT Press, Singapore