Smart Classroom - New Dimension of Learning:
the case study of Suan Dusit University Thailand

The scientific and technological advancement results in the present day's environment which is surrounded by computerized technologies. It is common that educational institutions in general invest their budgets in the procurement of modern equipment and technology in their classrooms. However, introducing technology into education efficiently and effectively cannot be achieved by merely designing a modern classrooms and introducing various new modern tools and equipment therein. The important and challenging thing for an organization is the confrontation with the changes which occur when new thing is introduced. The change from the traditional style of learning to the active learning or the so called Smart Classroom is the creation of a new dimension of learning because teachers will not merely have the skill and potential in appending the new tool to the teaching, but must also change their paradigm, insight, and idea on method of teaching and transferring of knowledge. This must be done in order to truly take the organization to a new educational culture and society.

Learning Process and Smart Classroom

Most of the traditional classrooms have the teaching format in which the teachers pass on the knowledge to students by explaining by words, actions, textbooks or other books. This format passes on only 10% of the knowledge which the teachers intend to transmit (Center for Research on Learning and Teaching, 2017). Therefore, the new format of the learning processes have been developed to conform to the adjusted context in order to increase the efficiency and effectiveness, such as the Active Learning or the Interactive Learning.

Active Learning is a learning process which promotes the participation of learners in thinking and synthesis (Center for Research on Learning and Teaching, 2017). The knowledge which learners will receive from this format of learning will emphasize on the actual participation procedure, problem solving, and synthesize and understand the context by the learners themselves. This is different from the traditional learning in which learners listening to teacher or reading from text alone. Education and Culture DG (2010) indicates that learning through the Active Learning method achieves higher learning result than through the traditional method. Learning through actual participation creates better understanding and longer memory of the content and information. Besides, this format of learning is more fun and enjoyable than the traditional method. As for the Interactive Learning, it is the format which emphasizes on learning through the interaction either between teacher and learner or between learners, either in a classroom or on an online network. Under this format, teachers who used to have the duty in the one-way transmitting of knowledge will have to adjust and change their role to be advisors who participate in the learning process (Education and Culture DG, 2010). Therefore, an appropriate environment must be provided for learning of either a small or large group in such a way that will make both teachers and learners interest in the activities and promote the connection in the knowledge and

thoughts between them. This will result in achieving the specified objectives and goals (Lunsden, Lumsden, and Wiethoff, 2010; Zosh et al., 2016)

Smart Classroom is an integration of technology and the traditional learning format to reinforce the experience by various information technologies (Pahey, 2014) which can well support the Active Learning and the Interactive Learning processes. From the study and research, it is discovered that the introduction of Smart Classroom into the normal learning and teaching process helps the collective learning in various subjects such as health and medical field or linguistic. As a result, learners can achieve a higher degree of learning (Huang, Yang, and Xiao, 2014; Pahey, 2014). However, the development of Smart Classroom needs to integrate various components to ensure that the objectives are achieved. The introduction of state-of-the-art information technology into an organization consists of various interconnected factors. Contexualism is the theory which helps in the analysis of the relationship between information. It is appropriate to be used in the analysis of relationships structure between various components as a foundation for educational technology development (Pettigrew, 1987, Smiths and Poel, 1996; Caldeira and Ward, 2011. Contexualism was founded in Warwick University in England in mid 1980's by a team of organizational strategy and change researchers. The study covered the components on the work of various developments of more than 100 small, medium, and large organizations. Every organization must confront changes which develop new things in it. This theory concludes that an initiative or new development in an organization should begin by studying the connection of three main components namely the context, the content, and the process, as shown in Figure1.
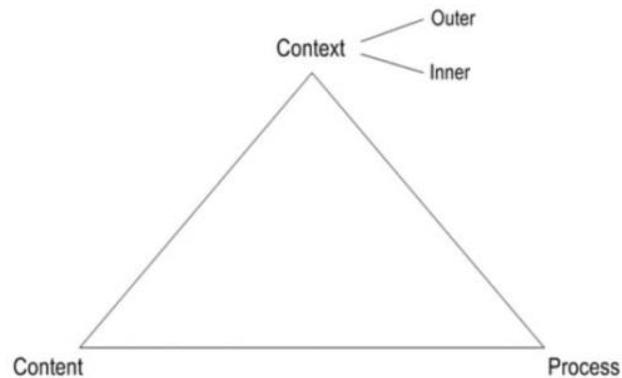

Figure 1: Contexualism (Pettigrew, Mckee and Perlei, 1988)

Context: According to Contexualism Theory, Pettigrew (1997) gave the meaning of context as the things that influences the thinking process, course and cause of change. The study of these things is to understand the context which occurs from either outer or inner factor, and affects the achievement of the specified objective or requirement. Organizational culture has an influence over the inner factor (Hill et al., 2012). Schein (2004) and can affect the people of that organization in doing or not doing this or that, as well as in the believing, the following, or the valuing.

Content means the characteristic, format, or boundary of the thing that is being studied which can be some products or equipment being introduced to be used in an organization (Pettigrew, 1997). If we are to talk about equipment or information technology system, Bouwman et al., 2005 points to the fact that the characteristic of the product is the main factor that affects the acceptability and the favorable attitude of the users for the development of the organization.

Process is the sequence of steps or activities which bring the change from one thing to another (Pettigrew, 1990) Kwon and Zmud (1987). There are six stages of information technology implementation in an organization, including: initiation, adoption, adaptation, acceptance, use and incorporation.

- Initiation: It includes scanning of organisation problems and gathering information regarding opportunities for IT solutions.
- Adoption: It is the stage when the decision to commit resources is made, to get organisation ready for the new technology implementation.
- Adaptation: It includes the IT installation, maintenance of new technology, and the development of new organisational procedures.
- Acceptance: It is the stage at which organizational members are induced to commit to using the new information technology
- Routinization: It is the stage at which the new information technology is encouraged as a normal activity.
- Incorporation: It includes the integration of new information technology within the organisation's system to support higher levels of organisational work.

Contextualism and Suan Dusit Smart Classroom

Suan Dusit Smart Classroom utilizes Contextualism theory in the conceptual framework of management by connecting the three main components which are Context, Content, and Process.

- Context consists of both the outer factor and inner factor of the university as follows.
  - Outer factor emphasizes on the policy on the national level which affects organization in realizing the benefit and the need of technology. The university is a governmental sector which must manage according to the framework and policy of the government. According to the study, it was discovered that technology for education was clearly specified in the master plan and policy of the Ministry of Education such as in the National Education Act 1999 section 9 http://moe.go.th/main2/plan/p-r-b4-01.htm) with the substance in promoting educational institution to append information technology into the learning and teaching or the Education Development Plan for Higher Education Edition No.11 (2012-2016) of the Office of the Higher Education Commission which emphasizes on the technological skill of teachers and learners in all levels of education (www.mua.go.th/users/bpp/developlan).
  - Inner factor emphasizes on the organizational level management policy; be it concrete objects such as building and equipment, or abstracts such as organizational culture and management. For this university, it is a public university which was first opened on May 17th, 1934. The main campus was built in Bangkok over 80 years ago. The University also has campuses throughout Thailand, with more than 2000 staff. The University now offer graduate degrees to doctoral level. For this university, if we were to think back on the past operation regarding information technology, we would discover that the university gave importance to it for many decades. It was

started in 1995 with the allocation of budget planning for information technology. In 1997, there was an investment on the fundamental structure and equipment. In 2000, a fully electronic library called the Virtual Library was established (Academic Resource Centre Handbook, 2016). This library provides educational facilities and resources such as Video on Demand, email network, online database, and automatic library system. In 2006, laptop computers were allocated to all new students as a learning tool. In 2007, Suan Dusit Internet Broadcasting (SDIB) was founded to produce and provide resource for educational broadcasting in digital format. Suan Dusit Rajabhat University is well-known for being a higher education institution with the most completed technological system in Thailand (Suan Dusit University, 2016). The educational development by introducing technology into the teaching and learning has been continuous and in 2014, the university introduced iPad as a learning tool under an educational cooperation project between the Department of Local Administration and Suan Dusit University in order to produce graduates in Early Childhood Education. And presently, the university still continuously develops the information technology. The evolution of the development of the information technology of Suan Dusit university is shown in Figure1.

1995	1997	2000	2006	2007	2014	Presently
IT investment planning	IT infrastructure implementation	Digital library establishment	Started the portable computer allocation project	Established SDU Internet Broadcasting	Utilized iPad as a learning tool	Continuous development of IT for education

Figure 1: The Development of Educational Technology of Suan Dusit University

The above information is a testimony that the university truly and continuously realizes the importance of technology for education. The use of technology for management and in support of education is nothing new for the university. The working environment is complete with facilities to support the use of technology. If the university wanted to introduce innovation or new technology such as Smart Classroom into the organization, there would be no problem for the personnel and students in terms of the potential and attitude because the IT acceptability and familiarity are already existed here (Niamsorn, Wainwright and Graham, 2011).

- Content is the characteristic and format of various equipment used in an organization. For Suan Dusit Smart Classroom, different kinds of fundamental IT equipment are introduced into classrooms, which are divided into two types:

Classroom Type 1 is a standard classroom where the fundamental IT equipments such as projector, 3D document camera, microphone and sound system, and the internet connection are installed.

Classroom Type 2 is a smart classroom which has all the equipment of the Classroom Type 1 but with the addition of the Interactive Learning supported equipment.

- Process is the sequence of steps or activities of Suan Dusit Smart Classroom development which, according to the principle of Kwon and Zmud (1987), include 6 stages as Table 1

Table 1: Procedure of Suan Dusit Smart Classroom according to Kwon and Zmud's process

Steps	Details
Initiation	The administrators of the university realize and play an important role in introducing the information technology into the organization continuously.
Adoption	There is a support and allocation of budget for the procurement of necessary equipment in the management of Suan Dusit Smart Classroom.
Adaptation	Various sections are assigned with responsibilities and work connections between them are established in order that the Smart Classroom System can be installed as specified. This includes the maintenance plan, the operation plan, and the system usage training.
Acceptance	User Manual is produced. Training on necessary functions is provided. Introduction to digital database through multi-media or various forms of the university's publications are also available in the Smart Classroom as well as the teacher training on innovative and creativities in each field of study.
Routinisation	Support, promote, publicize, and stimulate the usage of information technology in teaching and learning.
Incorporation	The 'SDU Smart Community' was established on the social network as a center to give advice, support, and solve problem which may occur from the use of the system, both on the equipment and the classroom management. Besides being a communication channel between the people involved in the development and installation of the Smart Classroom and the teachers who use the system, it is also a channel for teachers to exchange knowledge and recommendation among themselves as well as a chance to utilize our educational technologies to its fullest capacity.

Conclusion

The development of Suan Dusit Smart Classroom is aimed to integrate the Active Learning and Interactive Learning among teachers and learners with the support from proper equipment. This learning format does not only develop the learners to be familiar with the learning through activities, thinking, and synthesis, but also changes the paradigm of teachers while motivates both teachers and learners to learn together. The learning through technologies results in the transition from traditional format to a new format. But the investment in modern technology alone cannot give the real answer to the question on how to develop the learning process. The realization on the connection between various contexts must be fulfilled. And in order to understand the connection between different contexts, the Contexualism Theory is thus used in the development of Suan Dusit Smart Classroom. It is anticipated that both the teachers and learners have sufficient skills and potential in the information technology so that they are ready for the new era of education in which the thinking, analysis, and exchange of knowledge are emphasized.

References

Academic Resource Center Handbook. 2016. Rajabhat Institute Suan Dusit.

Bouwman, H., Hooff, B. V. D., Wijngaert, L. V. D. and Dijk, J. V. 2005. Information and Communication Technology in Organizations, London, SAGE Publication.

Center for Research on Learning and Teaching. 2017. Active Learning [Online]. Available: http://www.crlt.umich.edu/tstrategies/tsal

Caldeira, M. M. and Ward, J. M. 2011. Using Resource-Based Theory to Interpret the Successful Adoption and Use of Information Systems & Technology in Manufacturing Small and Medium Sized Enterprises. *The 9th European Conference on Information Systems.* Bled, Slovenia.

Education and Culture DG. 2010. Active learning and interactive, user-oriented teaching methods for active citizenship [Online]. Available: http://www.voicecomenius.org/ fileadmin/voice/pdf/Teacher_Module_3_Active_learning_and_interactive_ useroriented_teaching_methods_Prototype.pdf

Hill, P., Wu, X-J., Beadle, R. and Brown, G. 2012. Culture and Organisation, Pearson Custom Publishing

Huang, R., Yang, J. and Xiao, G. 2014. The Functions of Smart Classroom in Smart Learning Age [Online]. Available: http://www.lsl.nie.edu.sg/

Lunsden, G., Lumsden, D. and Wiethoff, C. 2010. *Communicating in Groups and Teams*, Wadsworth, Cengage Learning.

Niamsorn, SW., Wainwright, DW. and Graham, ME. 2011. A Model for Work-based Electronic Mail Diffusion and Assimilation: The Case of a Thai Higher Education Institutions. International Journal of Advances in Management Sciences

Office of the Higher Education Commission. 2012. Education Development Plan for Higher Education Edition 11 (2012-2016), [Online]. Available: http://www.go.th/users/bpp/developpan

Pahey, S. 2014. Smart Classroom [Online]. Available: http://www.addkutec3.com/wp-content/uploads/2014/07/SMART-CLASS.pdf

Pettigrew, A. M, Mckee, L. and Perlei, E. 1988. Understanding change in the NHS. *Public Administration,* 66**,** 297-317.

Pettigrew, A. M. 1997. What is a processual analysis? *Scandinavian Journal of Information Systems,* 13**,** 337-348.

Pettigrew, A. M. 1990. Longitudinal Field Research on Change: Theory and Practice. *Organization Science,* 1**,** 267-292.

Schein, E. H. 2004. Organizational Culture and Leadership, San Francisco, Jossey-Bass.

Smiths, M. T. and Poel, K. G. V. D. 1996. The practice of information strategy in six information intensive organizations in The Netherlands. *Journal of Strategic Information Systems,* 5**,** 93-110.

Suan Dusit University. 2016. The Annual Report 2016, Bangkok

The National Education Act 1999, Ministry of Education. Session 9 [Online]. Available: http://www.moe.go.th/main2/plan/p-r-b42-01.htm

Thirteen Ed Online. 2004. What are cooperative and collaborative learning? [Online]. Available: http://www.thirteen.org/edonline/concept2class/coopcollab/index.html

Zosh JM, Hirsh-Pasek K, Michnick Golinkoff R, Parish-Morris J. (2016) Learning in the Digital Age: Putting Education Back in Educational Apps for Young children. [online]. http://www.child-encyclopedia.com/technology-early-childhood-education/according-experts/learning-digital-age-putting-education-back.