

Constructionism in Thailand and its Transformative Effect on the Lifelong Learning Process

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Abstract

From 1997 until now, Thailand has implemented the practical approach to Constructionism in many schools, villages, and organizations. Studies of these success stories led to a theorized model of transformative learning consisting of three positive feedback loops. Technology, synergies among like-minded individuals, or certain beliefs such as respect, gratitude and compassion are hypothesized to expedite these positive feedback loops. We found the presence of the effect of technology on one of the feedback loops. Further investigation and quantification need to take place to verify our assumptions about the three success factors to the transformation Thai Constructionism movement was able to have in both private and public sectors in individuals, schools, villages, and organizations.

Keywords lifelong learning, constructionism, transformative learning, positive feedback, Thailand

Introduction: A Brief History of Constructionism in Thailand

1.1. Papert in Thailand (1997-2000)

Driven by the need for education development, a group of MIT alumni founded the Suksaphattana Foundation in 1996. Series of academic collaborations between Prof. Seymour Papert at MIT Media Lab and the Foundation since 1997 became what is called the Lighthouse project. The project's initial site was carefully chosen by Papert. Three initiatives were soon established consisting of (1) two non-formal education centers in northern Thailand, which offer school-level diplomas to underprivileged children and uneducated adult, (2) a community development program at a rural development center in Burirum province, (3) Vijiravudh College, a private boarding school in Bangkok. Papert and his students conducted workshops introducing project-based learning using

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Logo Programming, Lego robots, and Electronic Magazine. A number of new sites also emerged shortly after. The only currently existing group of constructionist activists in Thailand is led by Mr. Paron Israsena, a former CEO of the Siam Cement Group, one of the Thailand's largest industrial conglomerates, who dedicated his retirement years to reform the country's educational system. Currently, members of the Suksaphattana network consist of university professors, researchers, teachers, and community activists.

1.2. The Post-Papert Era (2000-present)

While the Lighthouse Project gradually wended down, the Suksaphattana foundation continued to pursue its mission. With the experiences gained both from the Lighthouse Project (for example [1] and [2]) and the ongoing field trials, the foundation began its numerous pilot sites as shown in Figure 1.

1.2.1 Eventual Fate of Papert Sites

Although all of the initial four sites have been inactive, a number of new projects spawned from these places are still thriving. For example, though the Burirum rural development center faded due to different approaches, a new program near Ban Limtong village remains highly active to date. For the remaining sites, the management either lost interest or were relocated. Ban Samkha village became an active member through the Lumpang site and many Lumpang activists still continue their work in the village.

1.2.2 The Establishment of Darunsikkhalai School for Innovative Learning (DSIL)

During the early years, a number of interested public schools asked to join the Lighthouse project. However, most schools quickly dropped out as a result of friction created by a new learning approach or a change in school management. The foundation, exhausted by the short lived partnerships, began its own school based on Constructionism. Housed inside King Mongkut's University of Technology Thonburi (KMUTT)'s campus, DSIL [3] aims to implement learning approaches with little restriction from the current educational system and full commitment from all its staffs.

1.2.3 The Expansion into Human Development in Private Sectors

In 1999, The Suksaphattana Foundation introduced a sub-program inside KMUTT's Faculty of Chemical Engineering's on-site Master's program. The course offers a project-based hands-on approach to Chemical Engineers from an industrial district in Rayong province. Using Logo and Lego Robotics as means to reflect upon the learning process, students would create their own projects and later pursue them in their respective workplace. Within a few years, the program gained its popularity as a successful approach for "productivity improvement by learning", which was then expanded to other industries.

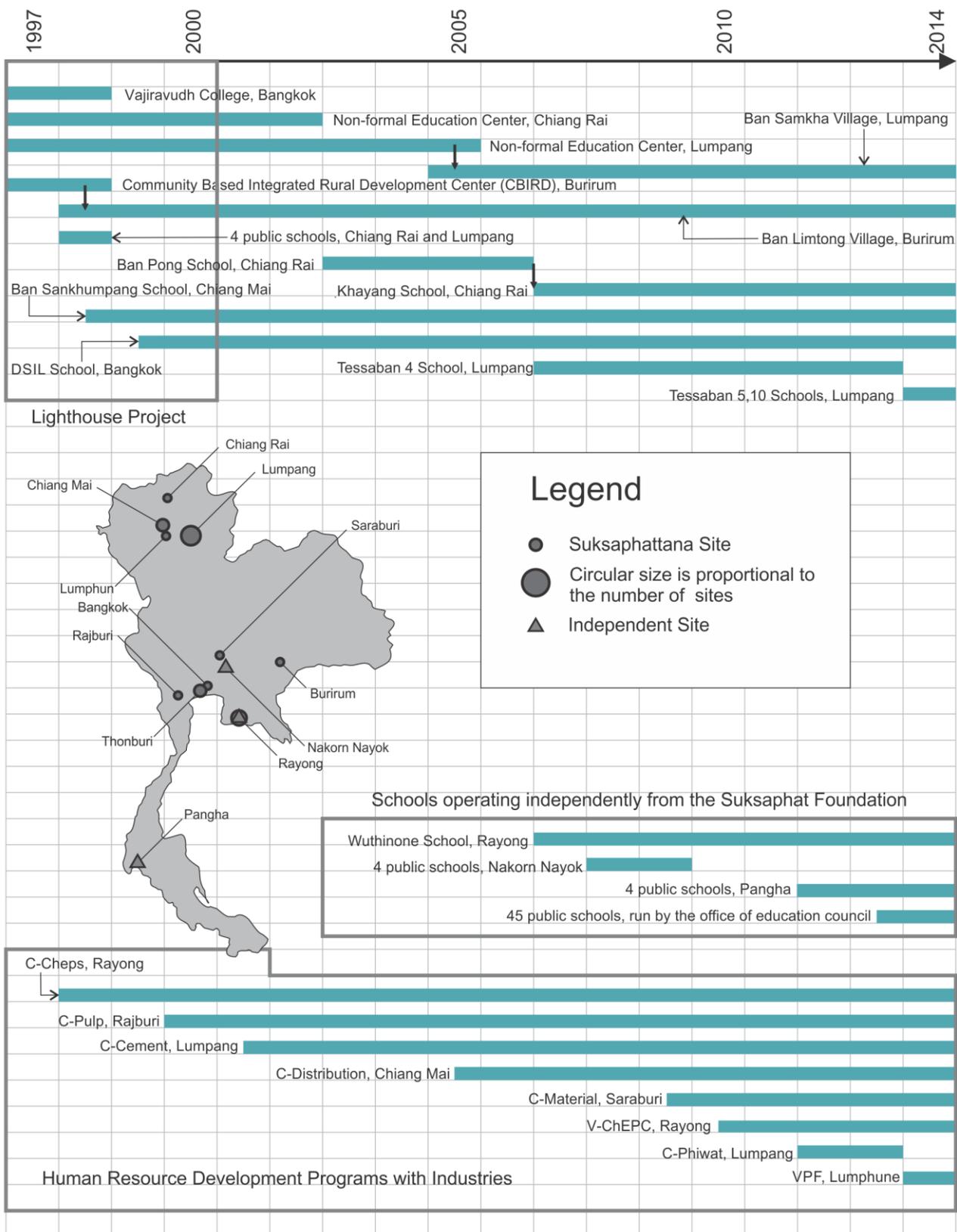


Figure 1. Diagram shows organizations involved with the Suksaphattana Foundation since 1997

plays a crucial role in enhancing such positive dynamics between motivation and planning/execution, i.e. the planning and execution process based on individual's motivation once expedited by technology can result in further satisfaction in learning, which then further enhances individual's motivation. When executing a thorough plan, one is bound to encounter problems. This model theorizes that when one continues despite challenges, lessons can then be extracted and transformation of one's mindset can be realized. When this transformative learning cycle is continuously repeated, "learning" then becomes a habit leading to a sustainable process of lifelong learning.

2.2. Resilient Culture

Learning is a cyclical process where one's understanding of a topic continually improves after each learning iteration. A teacher should apply this process not only to students but also to his or herself as well. That is, the teacher should perceive the current approach for conducting a class as his or her best model at the time but the next time around the method could always be altered and improved. This same process helps rural communities to view failures as valuable lessons for future improvements. Another example is the DSIL School. DSIL has adopted a "Learning Organization" model [5], founded by Peter Senge from MIT's Center for Organizational Learning.

One of the most prominent characteristics of Thais is resilience and adaptability. An approach that works well in one socio-cultural setting needs to be adjusted to work in another setting, while keeping the overall idea of an adaptive and transformative learning cycle as shown in Figure 3 intact. Moreover, an awareness of the social settings as observed in Samkha village could contribute to the snowballing effect of learning that began in a small setting of a local school and expanded to the entire village consisting of 152 households. Their local meetings, both structured and unstructured, are channels for villagers to propose new projects and express their opinions. These meetings particularly the unstructured ones are empowering each villagers and providing them opportunities to influence their local community, which in turns acts as a positive feedback to their learning process.

2.3. Presence of Constraints and Problems in society

Economic conditions in rural Thailand provide certain constraints that may expedite learning process. In the case of a villager in Ban Limtong Village, managing a project under a 20\$ budget is challenging, yet represents a complex constraint optimization that could lead to an efficient learning process. Similarly, a collective learning aimed at resolving the systematic debt problem of 550,000\$ for the entire Samkha village or the scarcity of water for daily usage. These problems are real and present in daily life. They act as motivators in the beginning of the learning process from which villagers draw their learning motivation. As the village overcomes the debt problem, villagers do not stop there. They began to invent new projects, expanding their ideas and trying to come up with ways to sustain these changes in their community. Hence, the presence of problems acted as initial driving force. However, since the local villagers have developed a lifelong learning habit, their learning continues to further improve their surroundings.

Prior to adopting constructionism in Samkha village, burning of the forest was not seen as a problem. Local villagers believed that burning forests brings abundance to their forests so that more mushrooms or vegetables will outgrow the forest that was not consistently burnt. Constructionism changed the mindset of these villagers. Currently villagers are now in discussion to come up with

systematic way to prevent and put off fire in the forests. Their scope of community work continues to expand.

2.4. The Role of Compassion, Respect and Gratitude from Mentor and Facilitators

Buddhist principles of compassion and gratitude play a major role in the mindset of facilitators, mentors and learners. Gratitude to one's mentor and facilitators propels one from feeling of hopelessness when encountering failures during the execution phase to determinations to overcome such challenges. Moreover, mentor and facilitators treating their learners with compassion and respect deepen the gratitude learners feel toward their mentor and facilitators.

The rest of this paper is dedicated to present the data that supports a small fraction of the above learning model with a focus on the role of technology in facilitating the transitional process from motivation to planning and execution.

3. Methods

Demographic of Participants. Data were collected from a themed project-based class from one semester (3 months) with 13 students (9 boys and 4 girls), with an average age of 11.9 and standard deviation of 1.9 (10 - 16 years). The opinion of 6 teachers were factored into our analysis. Students have attended DSIL on average for 3.15 years with a standard deviation of 1.46 (1 - 6 years).

Qualitative and Quantitative Analysis. This study employed both qualitative and quantitative methodologies using data parents' feedbacks, teacher evaluations and Fabrication Lab (Fablab) attendance.

Parents' Feedbacks. Prominent keywords parents used to describe their children were selected from the feedback forms. These keywords was categorized and 7 major characteristics such as passion (P), happiness (H), responsibility (R), creativity (Cr), identity (I), courage (C) and connectedness (Co) were then extracted. Keywords such as enthusiastic, excited, and interested fell into the category of Passion (P); happy, enjoying for Happiness (H); attentive, persevering, and responsible for Responsibility (R); innovative, being original, creative for Creativity (Cr); confident, proud of their work for Identity (I); willing to try new things for Courage (C); and knowing how to apply knowledge to daily life, talkative, sharing for Connectedness (Co).

Teacher Evaluations. All 6 teachers involved with these 13 students' education during the semester evaluated each student based on the above 7 characteristics. Each teacher scored each student on the 7 major characteristics such that the sum of all score added up to 10. All keywords associated with each characteristic were expressed both in Thai and English for Thai and non-Thai teachers.

Hours Spent in Fablab (T_f). Students in this class utilized the school's Fablab to assist in building prototypes for their individual projects. The recorded hours spent in Fablab for each student during the semester was used to calculate T_f as the cumulative sum of the number of hours a student spent in Fablab during the entire semester.

Based on the initial correlation between T_f and H , two groups were formed such that the correlation of T_f and H in Group 1 (G1) was statistically significant, but not in Group 2 (G2).

4. Results

There was no statistically significant correlation between the number of hours spent in Fablab and any of the 7 traits. However, when two linear regressions were applied to the data, the correlations between T_f and H , T_f and Cr , T_f and Co , and T_f and R were significant in one group, but not the other. We did not find any significant correlation between T_f and P , or I or C .

Happiness (H). In G1, the correlation between happiness and cumulative number of hours spent in Fablab was statistically significant with R^2 of 0.96 with positive slope. However, in G2, no correlation between T_f and H was found (Figure 3, left).

Connectedness (Co). T_f was negatively correlated with Co in G1 ($R^2 = 0.93$). However, no correlation between T_f and Co was found in G2 (Figure 3, right).

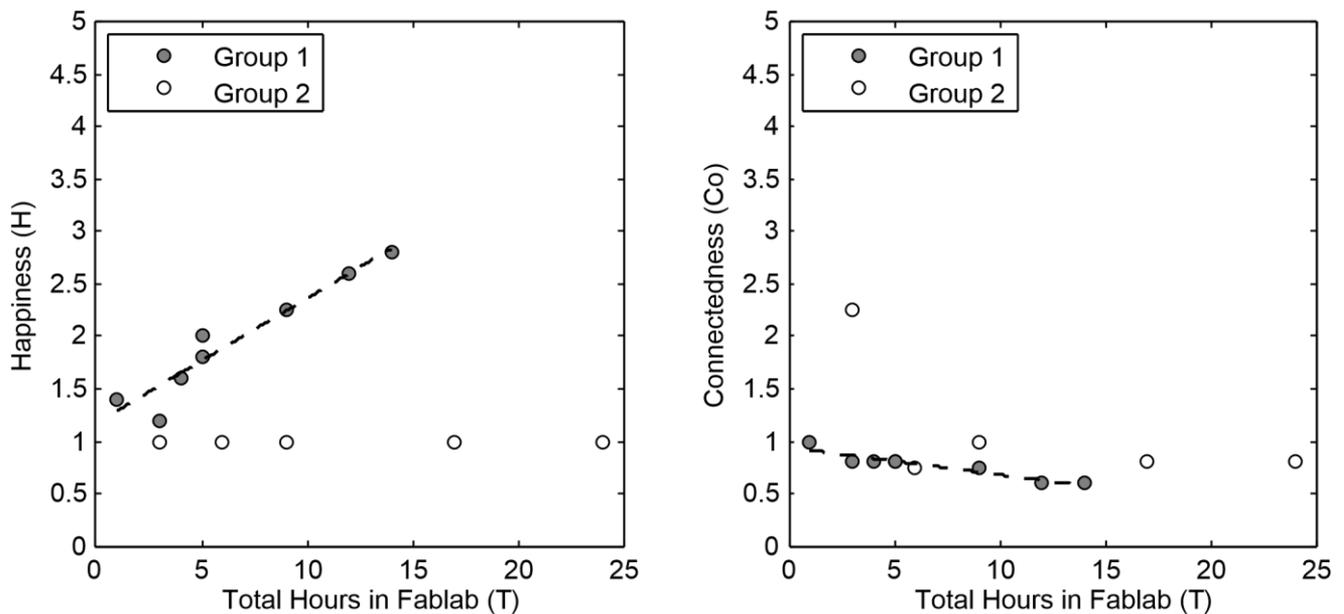


Figure 3. For students in Group 1, there were positive correlations between Fabrication Lab Hours (T_f) and Happiness (H), and T_f and Connectedness (Co). However, for students in Group 2, no correlation was found between T_f and H or Co .

5. Discussion and Conclusion

We found that the total number of hours spent in Fabrication lab was positively correlated with happiness, but negatively correlated with connectedness in Group 1 student. The effect of the use of Fablab was absent in another group. Based on the learning model in Figure 2, happiness is a byproduct of the motivation-to-planning process which can be moderated by the use of technology that could have had helped with the satisfaction of being able to physically construct objects. Connectedness plays a significant role in the formation of motivation.

The roles of teachers in facilitating this transformative learning process could lie in focusing on positive feedback loops, which could take place under certain circumstances with the right use of technology (Figure 2). For example, by using Fablab, the happiness of students was found to be correlated with how much a student uses the technology.

Other positive feedback loops that have not been clearly explained with data here remain our future research questions. Currently, the existing supporting claims are mostly qualitative, i.e. based on the journals of Mrs. Thipnangrong, a local farmer at Ban Limtong, we found that whenever Mrs. Thipnangrong encountered challenges during her project whose main objective was for her to survive, she would recall the compassion and respect her mentor and facilitators had for her despite her low status in society. Her gratitude served as a driving force that convinced her to not give up on her dreams. This positive feedback loop from planning to execution was enabled through such qualities prominent in Thai society. The third positive feedback loop involves the synergistic efforts between like-minded individuals. This was an obvious success factor for both Ban Limthong and Ban Samkha Villages. However, further quantitative analysis is needed to verify the existence and effect of these positive feedback loops.

There are limitations to the current quantitative approach. Due to a small sample size of 13 students in one single classroom, we cannot explain the reason that the two groups are differentiated as such. The groups could be differentiated by the student's demographics, or their familiarity with technology or teaching styles at DSIL, etc. More data needs to be collected to test these hypotheses.

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