【研究論文】

Development of Formative Assessment in Japan

Koji Tanaka　(Kyoto University)

Abstract

This paper examines how the understanding of formative assessment in Japan has developed as well as how it has been implemented in the past and present, and explores future challenges that may arise.

The formative assessment approach, advocated by Bloom, B.S. 1913–1999, was introduced in Japan during the mid-1970s. According to contemporary accounts, formative assessment was a strategy that can achieve a desired level of objectives through evaluations conducted during a class period. Formative assessment gained significance since relative assessment was the dominant method; it was a new and effective approach to shaping academic achievement.

However, there was a certain opposition to the rise of formative assessment. This critique argued that formative assessment might be nothing more than an efficient checking of children's goals for academic achievement. In other words, views on formative assessment remained shaped by vestiges of behaviorism, typical of programmed instruction. The basis for these complaints was founded in "Lesson study (Jugyo kenkyu)," which Japanese teachers worked hard to establish. It featured the "Idea that missteps (tsumazuki) can be utilized," the origins of which were apparent in the practices of Yoshio Toui, 1912–1991, and Kihaku Saito, 1911–1981.

The most distinctive feature of this theory was the "reversal idea." In the past, teachers and students, alike, had an aversion to missteps made during lessons. As a response to reversal ideology, teachers tenaciously pursued children's "missteps" and identified the cause, giving insight into the abundant "logic" behind them. Moreover, the teachers that discovered this did not consider these "missteps" as negative, but learned from them, creating lessons that capitalized on these "missteps." Formative assessment, which emanated from educational assessment research, gained importance as a compass for improving "teaching" and "learning" by supporting the ideology of utilizing "missteps."

However, in the mid-1990s, there was a further shift in the main subject of this "utilization," which was influenced by constructivist learning theories. This new way of thinking emphasized the idea that children's cognitive abilities were not merely structured by what they had been taught, but were instead actively and independently gaining new knowledge from the relationship to their existing knowledge. In doing so, the role of self-assessment became all the more critical in demonstrating how well the students themselves grasped this active and independent cognitive activity. It was deemed essential that formative assessment must merge with self-assessment.

Life-experience writing or the life-experience composition (seikatsu tsuzurikata) approach emphasized the importance of self-assessment in Japan's educational practices. This life-experience writing approach was unique to Japan. It encouraged students to self-assess by writing down facts about situations they confront during their daily lives or their actual thoughts at the time. Kazuaki-Shougi, who practiced the Hypothesis-Verification-Through-Experimentation Learning System (Kasetsu Jikkenn-Jugyo), affirmed the importance of self-assessment early on. These were the seeds for constructivist learning theories in Japan and the educational legacy that needed to be learned to bring formative assessments to a new stage of development.

In the 2000s, amidst globalization, a large scale Academic Achievement Survey is being implemented in Japan and academic competition has become more intense in educational institutions . Given this situation, there is certain concern that academic aptitude will lose substance. A strong demand exists

for the combined practice of formative assessment and self-assessment.

1. Introduction to formative assessments in Japan

Today, I would like to consider the current situation of lesson assessments by examining how formative assessment is understood and put into practice in Japan.

The formative assessment approach, advocated by Bloom (B.S. 1913–1999), was introduced in Japan in the mid-1970s. Contemporary thought in Japan recognized that "relative assessment" was problematic and the alternative educational assessment approach was explored as its replacement. Mastery learning, as advocated by Bloom, in addition to criticizing relative assessment, guaranteed academic achievement for all children and became largely influential in Japan. Specifically, many people were drawn to formative assessment, which was crucial to mastery learning[1].

According to Bloom, educational assessment could be classified into three categories: "diagnostic assessment," "formative assessment," and "summative assessment." Within the context of relative assessment, educational assessment would be beneficial only as "general assessments" or "summative assessment" at the end of classroom teaching to rank and sort children. However, if educational assessment was to be implemented to ensure children's academic achievement, then diagnostic assessment would also be necessary to grasp the students' levels before administering lessons.

Furthermore, the evaluations performed during a class period are formative assessment. The information extracted from formative assessment is received as feedback. If the class is not in synchronism with the educational objectives, corrective activities would be set in place to correct children and revise the syllabus. On the other hand, if most of the children in the class understood the material, then enrichment activities would be organized. Thus, formative assessment adapted and conducted during class would further secure children's right to learn.

Bloom's proposed "the mastery learning theory" had a great impact on Japan's educational world in the 1970s as an instruction theory that surpassed relative assessment. In particular, the formative assessment approach showed Japan's teachers the importance of using educational assessment during class. At the same time, Japan's teachers observed that formative assessment was not just conducting quizzes, but also "oral questioning" and "circulating among students' desks and checking on their work." For example, "oral questioning" was a medium through which teachers ask students a "question" that encourages them to think and also ascertains their level of understanding through formative assessment.

2. "Idea of utilizing missteps (tsumazuki) " to support formative assessment

However, there was a certain opposition to the rise of formative assessment. This critique argued that formative assessment might be nothing more than an efficient check of children's goals for academic achievement through repetitive correction of missteps. In other words, views on formative assessment remain to be framed by the indication of Behaviorism, typical of programmed instruction. Behaviorism, as mentioned here, is defined as "a process of forming connections between stimuli and responses" and therein the learning agent is considered to be a black box.

The basis for these complaints was founded in "Lesson study (Jugyo kenkyu)" that Japanese teachers worked hard to establish. It featured the "idea that missteps (tsumazuki) can be utilized," the origins of which were apparent in the practices of Yoshio Toui, 1912–1991, and Kihaku Saito, 1911–1981. Yoshio Toui and Kihaku Saito developed "lesson study" in Japan, most notably after World War II. In essence, Japan's teachers tackled the notions within lesson study: "cooperation instead of individual action," "repeating incidents instead of isolated incidents," and "conducting investigations by one's self instead of subcontracting a researcher"[2].

The most distinctive feature of this theory was the "reversal idea." In the past, teachers and students, alike, had an aversion to missteps made during lessons. As a response to the reversal idea, teachers tenaciously pursued children's "missteps" and identified the cause, giving insight into the

abundant "logic" behind them. Moreover, the teachers that discovered this did not consider these "missteps" as negative, but learned from them, creating lessons that capitalized on these "missteps." Formative assessment, which originated from educational assessment research, gained importance as a compass for improving "teaching" and "learning" by supporting the idea of utilizing "missteps."

In 1957, Yoshio Toui left behind the following famous words: "Children are stumbling geniuses"[3]. Teachers viewed children's missteps as detrimental to the lesson and wanted to avoid them as much as possible. In contrast, Toui thought that children were not randomly making mistakes, but that they were geniuses making missteps based on given "rules." He identified these rules as "the Logic of Everyday Life," derived from the thought process characteristic of children (hereafter, the "naive concept" indicated by the "miss concept" of children) and "the Logic of Subject Matter" from problems in teaching (i.e., problems with text books and teaching skills) . He claimed that analysis of missteps reveals teaching gems. Quite precisely, "children are stumbling geniuses."

Of course, Toui was not aware of formative assessment. However, analysis of these missteps highlights the Logic of Everyday Life and the Logic of Subject Matter. Given this, it would not be an exaggeration to say that his approaches attempting to improve the current state of teaching and learning are themselves the essence of formative assessment. Accordingly, Toui earlier indicated that formative assessment is not merely skills of examining children's success or failure, but a means to improve classroom practices by utilizing children's missteps.

On the other hand, in 1958, Kihaku Saito also proposed "the sharing system of error in an attempt to share each misstep"[4]. This was an attempt to dismiss blame for the child who made the misstep during class. By formulating and classifying it instead as "the sharing system of error in an attempt to share each misstep", the misstep would then be shared by the class and transformed into an object of corrective learning. "Reversal idea" for missteps, which shared common ground with Toui, and the concept of expanding formative assessment to learning groups was extremely novel from a contemporary perspective.

Thus, formative assessment originated in Japan over the course of the 1980s as support for the idea that missteps can be utilized.

3. Constructivism and formative assessment

However, in the mid-1990s, there was a further shift in the main subject of this "utilization," which was influenced by constructivist learning theories. This new way of thinking emphasized the idea that children's cognitive abilities were not merely structured by what they had been taught, but instead were actively and independently gaining new knowledge from the relationship to their existing knowledge. In doing so, the role of self-assessment became even more critical in demonstrating how well the students themselves grasped this active and independent cognitive activity. It was deemed essential that formative assessment must merge with self-assessment.

Life-experience writing or the life-experience composition (seikatsu tsuzurikata) approach emphasized the importance of self-assessment in Japan's educational practices before World War II[5]. This life-experience writing approach was unique to Japan. It encouraged students to self-assess by writing down facts about situations they confront in their daily lives or their actual thoughts at the time. This process of teaching shifted from life-experience writing to reading these writings in front of the class and finally discussing them with the class. Through this process, children are able to clearly evaluate themselves based on their own lives.

Kazuaki-Shouji, who practiced the Hypothesis–Verification–Through Experimentation Learning System (Kasetsu Jikken-Jugyo), affirmed the importance of self-assessment from 1965[6]. According to Shougi, since "education is the work of constantly driving children to realize that they are improving," teachers "construct avenues for children to easily evaluate themselves" for this purpose. Then, they suggest various methods for self-assessment. Shougi does not claim that self-assessment is linked with specific method of

assessment , but essentially, he does indicate the necessity of always creating innate opportunities for self-assessment to establish true educational assessment. On the contrary, he indicates that assessment methods that lack the opportunities for self-assessment are little more than simple skills of judgment.

These life experience writing and Shougi's approach were the seeds for constructivist learning theories in Japan and the educational legacy that needed to be learned to bring formative assessment to a new stage of development.

4. Practice of formative assessment that integrate self-assessment

Now, I will introduce two formative assessment practices that integrate self-assessment. One is "Learning System based by Learning Task" advocated by Yasutaro Tamada, 1927‐ 2002, who is known in Japan as a "master of lesson planning." The other is the practice of "One Page Portfolio Assessment: OPPA" devised by Tetsuo Hori, who introduced Japan to "naive concept" research.

a. Practice of Learning System based on Learning Task

Steps for Tamada's Learning System based on Learning Task are as follows [7].

① The teacher presents the learning task.

② The children write their own thoughts in a section titled "What I think" in a notebook.

③ The teacher offers different ideas and asks for a show of hands to determine the distribution of that idea among the students.

④ The children express and debate their own opinions.

⑤ The students write down the opinions of others under "Other People's Opinion" in their notebooks.

⑥ After debate, the teacher checks the distribution of ideas and how it has changed by a show of hands.

⑦ The teacher (or in some cases, a student) confirms the hypothesis with an experiment.

⑧ The children write down what they think under "Experiment results and what I learned" in their notebooks.

⑨ The children read what they wrote in step 8 starting with those children who are done writing first.

For their learning task, while considering the foundation of cooperative learning, the children consciously "write in their notebooks" as in steps ②, ⑤, and⑧. According to Tamada, writing in their notebooks is a "formative assessment." The role of evaluation for the teachers is to "try to understand what is going on in the minds of the children" who have addressed the learning task, participated in the debate, and learned the results of the experiment. On the other hand, this is a "confirmation for children of their independent learning" and a self-assessment of what they are learning as part of the learning group and how their awareness has changed. Formative assessment like these provides important clues for the "teacher's evaluation of the class."

As an example, I would like to introduce the lesson development with the attainment target of "for plants, flowers are the organs of reproduction." First, a rapeseed plant is used as instruction material; the students observe the structure of the plant and the mechanism of pollination. Then, as a developmental learning task, children are asked "can you identify the fruit and seeds on this blooming tulip"? (①) and a discussion begins. Of course, from their life and learning experience thus far, many children think "tulips are raised from bulbs and so do not produce fruit or seeds" (②,③). On the other hand, some children think that "tulips can also produce fruit and seeds" and "the children's expression and debate of their own opinions" begins (④).

Afterwards, a child wrote the following under "Other People's Opinion" in their notebook: "First, there was the opinion that the tulip was a plant so of course it produces seeds. I disagreed with that opinion. The reason was that I had never heard of a tulip seed, and tulips are planted as bulbs, so I disagreed. Next, someone strongly proposed that tulips grew from bulbs. I agreed with that. Then, someone asked 'if that is true, then why do they have stamens and pistils"? This provides a glimpse of the children's debate.

Then the students observe the pistil ovaries and ovules and by confirming the fruit and seeds harvested (⑦), they are surprised by the realization that tulips do in fact have fruit and seeds. A student wrote the following in his

notebook under “Experiment results and what I learned” (⑧,⑨): “There was an ovule. I saw what was raised afterwards. The ripened seed was a reddish purple, thin, and triangular. Based on this, it is certain that it can produce seeds. I learned that bulbous plants have flowers that bloom ,and produce fruit and seeds. Uchida, my classmate, asked how is that they do not spread seeds but instead grow from a bulb, and I thought that it takes too long before the flower blossoms if seeds are planted, which is probably why they plant bulbs.” The children actively debate this learning task, and it can be understood through formative assessment in this notebook that the children listening to the arguments are also steadily participating in cooperative learning.

b. Practice of “One Page Portfolio Assessment: OPPA”

OPPA is a practice that many teachers follow.(See,Figure1,2). It was devised by Tetsuo Hori, who introduced the “naive concept” to Japan[8]. OPPA is a method where students record their class achievements before, during, and after class on one sheet (OPP sheet: One Page Portfolio Paper) as a learning record, causing students to evaluate themselves. As opposed to a normal portfolio assessment, the point is to maximize the least amount of information necessary for assessment, because it uses one sheet of paper,

It allows teachers to review the learning progress before, during, and after the lesson, as well as organize and prepare what students record on the sheet of paper to utilize the results in their teaching. Students can visibly track their growth following this specific information. It is thought to foster the ability to learn and think independently in students.

Usually for OPPA, one OPP sheet is created to grade each unit’s lesson plan. Next, students are made to fill in their learning record after each class. Teachers review these sheets by making appropriate comments and attempt to improve their learning. Through this repetition, students evaluate their learning progress as a whole after each unit is completed. It is a method that makes students evaluate themselves.

I will explain the essential structure on which this is based.

An OPP sheet is organized into four parts: “I. Unit Title ,” “II. Essential Questions Before and After the Learning,” “III. Learning History,” and “IV. Self-Evaluation after the Learning.”

The teacher may write down “I. Unit Title,” although some teachers have the students write it down after the unit is complete. This is to improve their ability to reflect on the whole unit and summarize it accurately.

“II. Essential Questions Before and After the Learning ” establishes exactly the same questions before and after learning so that students can compare and recognize differences. This questions include points such as what the teacher wants to confirm and transmit through the unit. Questions that simply ask whether they remember are unsuitable. “II. Essential Questions Before the Learning ” is a diagnostic assessment, and “II. Essential Questions After the Learning” is equivalent to a summative assessment.

“III. Learning History” is a column where students write “the most important point in today’s lesson” for each class. Since the OPP sheet uses a single sheet of paper, when there are many periods in a unit, it is necessary to divide and group it into smaller units so that the learning record is on one page. The students are made to write the most important point in today’s lesson so as to allow the students to improve their ability to choose the essentials from the topics and information dealt with in class, consider it, and summarize and express it in their own way. Some teachers have the students write the title in the learning history column. This causes them to improve their ability to appropriately express the information from a given class period. This learning history is equivalent to a formative assessment.

“IV. Self-Evaluation after the Learning” is a column where students reflect on their learning as a whole and question how they feel about what, why, and how something changed. This self-evaluation is a final, all-encompassing assessment and it is especially important. This is reported to have the ability to reach students, and

instill within them a sense of their own personal growth and self-efficacy.

5. Summary

This is an introduction on the development of formative assessments in Japan. In summary, I would like to correlate the history of this development to the different stances on missteps.

"Missteps are the children's fault"–This relative assessment stance considers the cause of missteps to be the children's insufficient ability or effort.

"Lessons without missteps"–This is the belief that a misstep in a lesson should not occur. So that missteps can be promptly corrected, the objective is to eliminate them and emphasis is placed on efficient teaching alone. This stance grasps formative assessment from a behaviorist perspective.

"Lessons where teachers utilize missteps"–Missteps are treated as important teaching opportunities and lessons arrange missteps in an attempt to shape academic achievement, but this utilization is limited by teachers and the reality of children's learning is not nearly sufficient. This is a formative assessment stance derived from educational research by Japan's teachers.

"Lessons where both students and teachers utilize missteps"–Students and teachers cooperate to subjectively overcome missteps. Then, they review their progress and missteps, along with creating settings where they can proactively voice what they did not understand in the classroom, working to transform missteps that are confronted and differentiated within the learning group into learning tasks. This stance grasps formative assessment from a constructivist perspective.

This self-assessment is dependent on the trust in children's competency and ability to develop. Integrating this self-assessment into formative assessment in this way makes it possible for children to become confident learning agents. Furthermore, in the 2000s, amidst globalization, a large scale Academic Achievement Survey is being implemented in Japan and academic competition has become more intense in educational institutions. Given this situation, there is a concern that scholarship will become meaningless. In this situation, there is indeed a strong demand for the practice of formative assessment that incorporates self-assessment.

(本稿は、2011 年 11 月 4-6 日に中国・華東師範大学で開催された「International Conference on Classroom Assessment」のために準備した発表原稿を基にしている)。

注

[1] Bloom, B.S and et al, Handbook on Formative and Summative Evaluation of Student Learning, McGraw-Hill Book Co, 1971.

[2] National Association for the Study of Educational Methods(ed),Lesson Study in Japan. Keisuisha Co, 2011.

[3] Toui, Yoshio, Mura wo Sodateru Gakuryoku , Meijitosho Shuppan Corporation, 1957.

[4] Saito, Kihaku, Mirai ni Tsunagaru Gakuryoku , Mugi Shoubo, 1958.

[5] Nakauchi Toshio, Seikatsu Tsukurikata Seiritsushi Kenkyuu , Meijitosho Shuppan Corporation, 1970

[6] Shouji, Kazuaki, Kasetsu Jikken Jugyou , Kokudosha, Co., 1965.

[7] Tamada, Yasutaro, Rika no Toutatsu Mokuhyou to Kyouzai Kousei, Azumi Shoubo, 1990.

[8] Hori, Tetsuo, The Concept and Effectiveness of Teaching Practices Using OPPA, *Educational Studies in Japan,International Yearbook* No.6, 2011.

（教授）

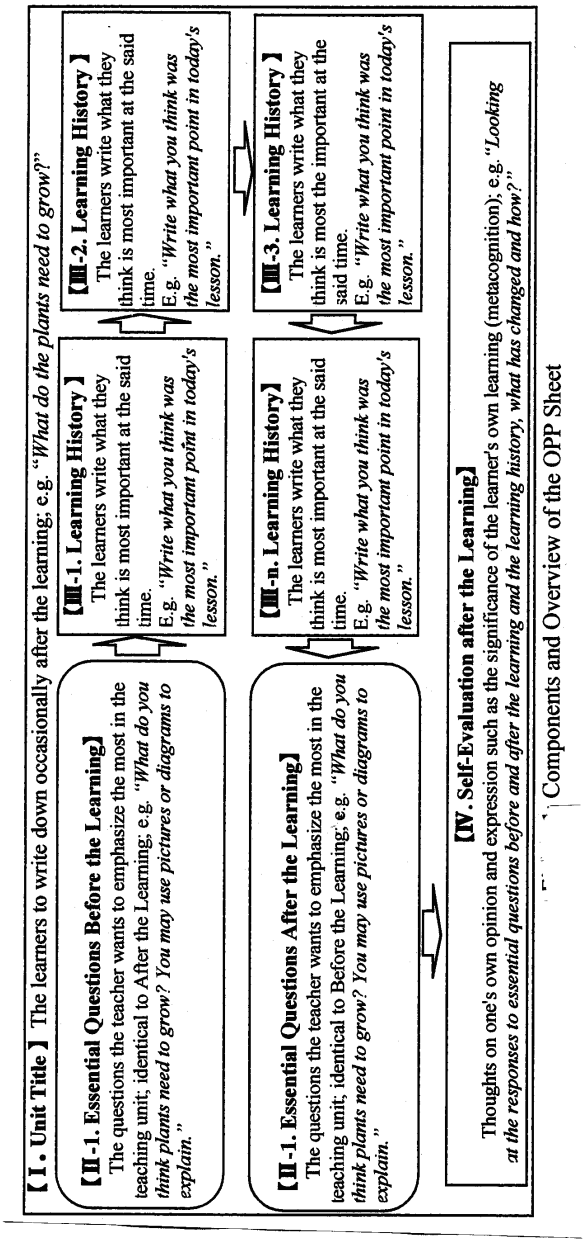
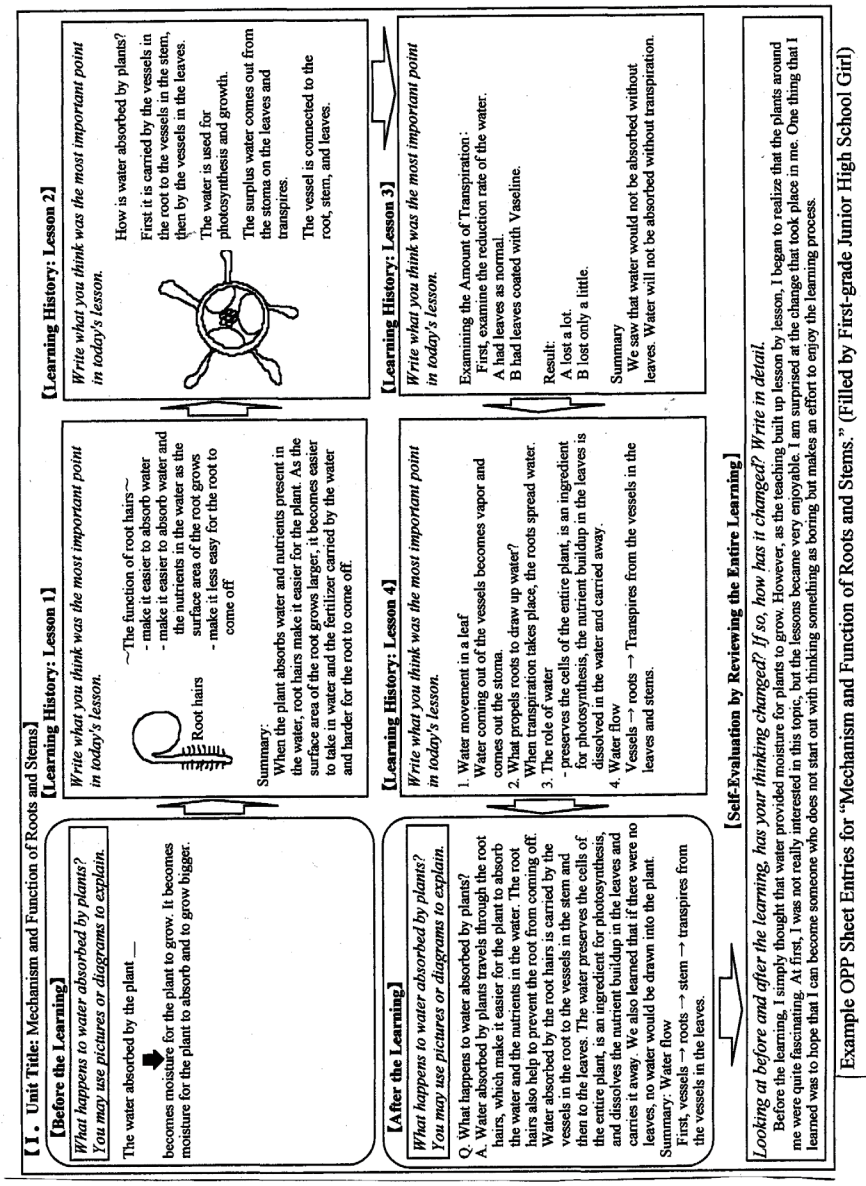


Figure1:Components and Overview of the OPP sheet



Example OPP Sheet Entries for "Mechanism and Function of Roots and Stems." (Filled by First-grade Junior High School Girl)

Figure2:Example OPP Sheet Entries for Mechanism and Function of Roots and Stems.