Practice and evaluation of mentoring support system for novice teacher

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Abstract: This paper describes the development of a software program for mentoring novice teachers and trial mentoring practice. It can be effective for experienced teachers to observe classes taught by a novice teacher, and then have both reflect on student behavior in the classroom. However, there are some problems with this type of discussion. It is difficult for teachers to discuss specific children, as their conversation focuses on abstract matters such as teaching skills or theory. It is also hard for novice teachers to formulate a correct interpretation of what experts say. To solve these problems, we developed the mentoring support system "FRICA," which is a software program composed of a tablet pc and web camera. Experienced teachers can record the behavior of school children during lessons being taught by novice teachers, and both can afterwards view the recorded movies of each child in chronological order. FRICA can significantly increase the amount of time spent on discussion of children during teachers' reflective conversations (Wakimoto et al. 2010). This study describes how experienced and novice teachers can reflect on lessons using FRICA, including their thoughts and impressions of using it for mentoring, the effects of which are examined using qualitative data.
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Keywords: Novice Teacher, Mentoring, Lesson, Reflection

1. Novice teachers and Mentoring of lessons

How to foster novice teachers is an issue of importance around the world. In Japan, for example, the percentage of young teachers is increasing due to the mass retirement of baby-boom teachers and resultant mass recruitment of new teachers. In the USA, half of newly-hired teachers will resign from their job within the next three years, which implies seriously challenging situation for novice teachers. Accordingly, the need for fostering the teaching skills of novice teachers has risen and has increased received attention in recent years. Although there are various ways available for teachers to learn teaching methods such as Lesson Study, this study focuses on 'mentoring'.

Mentoring is defined as a relationship between an older, more experienced mentor and a younger, less experienced mentee for the purpose of helping developing the mentee career (Kram 1985). Although the effects of mentoring have already been reported (Darling-Hammond 2003), there are some problems with mentoring. One problem is that the effect of mentoring depends on the ability of the mentor (Kennedy 1991, Everrtson and Smithey2000), and the need for examining mentoring methods and their difficulty is essential.

Now we discuss an effective way to implement mentoring in classroom teaching. It is vital for teachers to reflect on his/her class with others when learning about classroom teaching. Reflecting and noticing how children learn in class can help teachers to develop their career. However, classes are so complicated that novice teachers cannot necessarily grasp their problems on their own. One solution to help overcome this obstacle is for experienced teachers to observe the classes of novice teachers, and then afterwards reflect on the class cooperatively.

One concern, however, in implementing this is the difficulty of discussing the children during a mentoring session. Inagaki and Sato (1996) point out that discussion during sessions tends to focus on teaching techniques, and not on the actual learning process or experiences of the children. In addition, novice teachers do not necessarily comprehend an experienced teacher's comments about a certain child. This is because novice teachers do not perceive and investigate each child in class (Inagaki and Sato, 1996), and hence it is likely that the novice teacher cannot comprehend and reflect the particular situation which the experienced teacher raises after class.

To solve these problems, FRICA was developed by Wakimoto and others as a system of mentoring support for novice teachers (Wakimoto et al., 2010). FRICA is a system which supports mentoring by focusing on the children in the classroom. An experienced teacher records a novice teachers' classroom teaching, which enables cooperative reflection of the class using the video. The authors have supported this type of mentoring for novice teachers by using FRICA. As a result, it has been demonstrated that the use of FRICA led to an increase in the amount of reflective conversations on children (Wakimoto et al., 2010). However, the effect of FRICA in a qualitative way, such as actual advice given to the novice teacher, has yet to be fully demonstrated. Accordingly, this study investigates the effectiveness of FRICA qualitatively, by examining how FRICA functions in reflection of the class and how novice and experienced teachers perceive the system.

2. Development of the system

FRICA is a system enabling an experienced teacher to record children in a class taught by a novice teacher, and then both teachers reflect and discuss the contents of the class by watching the film. The system enables mentoring which focuses on the children in class. FRICA was developed using Microsoft Visual C#. A small and light tablet PC with a control-pen is used in order to reduce the teachers' burden of using a heavy PC or a mouse for recording. FMV LIFEBOOK FMV-P8240 (Figure 1) and a web camera were utilized. FRICA includes two modes:

Figure 1 . Hardware

lesson mode and dialogue mode. Lesson mode is used when an experienced teacher records a class taught by a novice teacher. Dialogue mode, on the other hand, is for both teachers to reflect on the recorded class. Descriptions of each mode based on Wakimoto et al. (2010) are explained below.

2.1.Lesson mode

(1) Interface

Figure 2 shows the screen of lesson mode. As is shown in the figure, ①record button, ②check button, and ③attention meter are on the left side of the screen. The record button for is equipped for each individual child, and the check button and attention meter are the same. The ①record button is pressed by an experienced teacher for recording children. When a novice teacher has an interaction with a specific child, the ②check button for the child is pressed. The ③attention meter consists of two bars. The green bar on the left shows the number of a teacher's watching the child using the dialogue mode, and the orange bar on the right shows the number of the check button being pressed, referring to how often the novice teacher paid attention to the child. There are ④end button, ⑤clock, ⑥monitor, and ⑦teacher's button on the right. ④End button is pressed when the class is over, which returns to the menu screen. ⑤Clock shows the elapsed time from the beginning of class, while ⑥monitor displays a video image through the web camera. ⑦Teacher's button is pressed in order to record a novice teacher.

(2) Method of operation

When recording, the user at first focuses on the target child. (Figure 3) After recognizing the child on ⑥monitor, the ①record button is clicked for the child using a pen to start the recording. When the recording is finished, the record button is pressed again to stop recording. ②Check button is pressed when a novice teacher intends to place attention on a particular child. The check button of the child is pressed and the number of 'attentions' is counted to represent it for each child on the ④Attention meter. This process continues throughout the whole lesson.
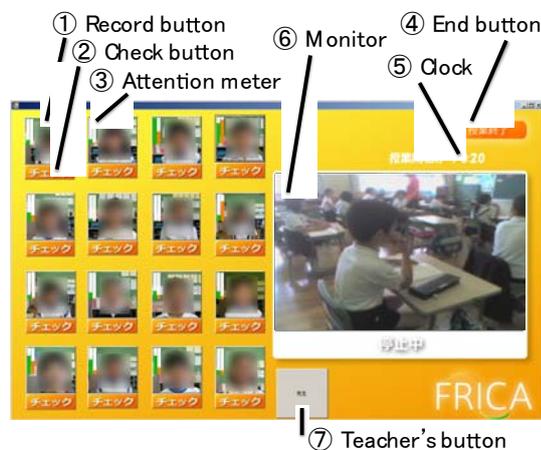

Figure 2. Lesson mode

Figure 3. Recording scene

2.2. Dialogue mode

(1) Interface

Dialogue mode consists of ①Movie button, ②Attention meter, ③Monitor, ④End button, ⑤ Timeline, and ⑥Movie list. ①Movie button is pressed to view the movie of each child. ②Attention meter in dialogue mode is the same as that in lesson mode. ③Monitor shows movies which are selected by the viewer. ④End button finishes a dialogue and returns the user to the menu screen. The movies of every class of the day are displayed in chorological order in ⑤Timeline. When a record button of a certain child is pressed, ⑥Movielist shows the list of his/her movies, including those from past classes.

(2) Method of operation

Figure 5 shows the process of two teachers while mentoring is taking place. They both face a tablet PC and have conversations while watching the movie. There are two ways to view movies: (1) by clicking the ①

Record button of a particular child from a list of whole movies, and (2) by selecting a movie from ⑤Timeline. The first method (1) is used when a teacher needs to trace the behavior of a particular child. If he/she clicks the record button of the child, the thumbnails of the child are displayed in chronological order in movie list, and the movie is played by clicking a thumbnail. The second method (2) allows teachers to reflect on the class in chronological order. The teacher can view the movie of a particular period of the class. For instance, what happened during a certain time and the behavior of children at that time can be seen by using this. ⑤Timeline consists of several tabs of a 15-minute period, which includes every movie of the period. By selecting and clicking a certain thumbnail, teachers can view a movie of a child at a particular time.

In this way, the dialogue mode allows teachers to view the movies of each child throughout the whole class or at a particular time during the class.
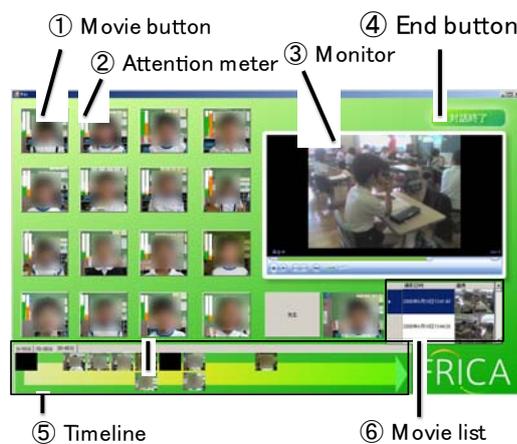

Figure 4. Dialog mode
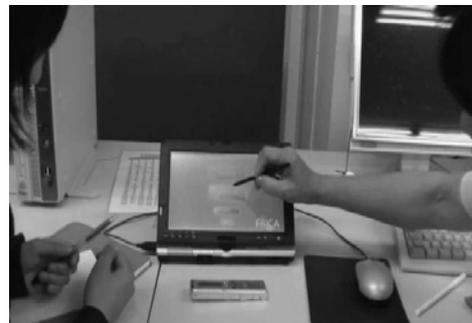
Figure 5. Dialog scene

4. Practice and evaluation

FRICA was implemented using one pair of teachers (novice and experienced) at a public elementary school in Tokyo, at which mentoring is conducted on a daily basis. The practice is as follows. Five sessions of regular mentoring were conducted, followed by seven times of mentoring using FRICA. Then, regular mentoring without using FRICA was again conducted five times. During regular mentoring, the experienced teacher observes the novice's teaching, followed by reflection after the class.

For evaluation, the reflection of the class was monitored, and after each mentoring with and without using FRICA, a semi-structured interview was conducted between the novice and experienced teachers. In the interview, the novice teacher was asked about his (1) perception and (2) comprehension through the process of reflection. To the experienced teacher, the following was asked: (1) descriptions of his instruction and the reaction of the novice, and (2) his opinion about the reflection.

5. Result

In this chapter, we examine the actual case of using FRICA, such as the contents of reflection, and advice by an experienced teacher. FRICA enabled an experienced teacher to record children from his viewpoint and convey the behavior of children to the novice. In terms of her viewpoints during the recording, she expressed in the interview as follows. 'I put focus on the behavior of children, especially those who cannot concentrate or work on their tasks, and how the teacher is working. … I hope she (the novice teacher) is able to notice the hard work of the children.' According to previous research by Wakimoto et al. (2010), the experienced teacher mainly recorded the behavior of the targeted children, but also recorded those children who worked hard while concentrating. The novice teacher stated in the interview, 'I could examine the behavior of children who had lost their concentration, or

those pretending to have concentration.   It was of great use to examine some other children who worked seriously and attentively, spotted by an experienced teacher.'   We investigated two factors which were referred to by both the experienced and novice teacher….. to discover the beneficial reflection with the use of FRICA.   Below, the case of two children is examined; child A was the topic of every reflection due to his little attention, while child B was good at concentrating on the lesson.

Firstly, we examine the teachers' reflection regarding child A.   A was frequently engaged in something different from classroom tasks.   The reflection of one math class, in which A drew cartoons in his notebook without working on classroom task, is described below. (Fifth use of FRICA in class)   The novice teacher is speaking while using a blackboard, and she does not notice child A drawing cartoons.   The experienced teacher shows the scene to the novice.

E (Experienced teacher): What do you think he drew in his notebook?
N (Novice teacher): A picture.
E: Some kind of cartoon, can you recognize them close up?
N: Well…
E: This child was inside his own world, unrelated to the math exercises.   When you asked the class 'what is the answer?', writing on the board, he was speaking to his own notebook.
N: I see.
…..
E: Once he gets interested in something, he will do it freely, I suppose.   And he has a rich imagination.   But he cannot work on what was directed.   So you can try asking him to work on 'one' task, even just one…   or lower your voice to say gently 'can you work on this task?' to A, who is in high spirits.

The experienced teacher recorded the behavior of A, drawing cartoons, which was not noticed by the novice teacher during class.   Then concrete advice was given by asking him to speak to A by directing him what to do step by step.   Thus, FRICA allowed the experienced teacher to perceive the way to treat each child and give advice to the novice teacher.   The novice teacher is able to know the viewpoint of the experienced teacher through the video, recognizing the behavior of children which she was unaware of.   This could make a difference in communication with children.   The effect of visual image has been demonstrated by Wakimoto et al. (2010), and this case has strengthened the effectiveness.

Next, we examine mentoring regarding child A in the Japanese class three days after the previous case (Sixth use of FRICA).   The experienced teacher perceived the attempt of the novice teacher in treating A in various ways. The ways and behavior of A after the interaction with the teacher were recorded.   Some of them are as follows.

E: I see you are very concerned with A.   This is the voice of A, isn't it?   Did he grab his color pencils?
N: Yes.
E: Doesn't he keep them inside his desk?
N: He always takes them.
E: You can say to him to keep them in his desk.   He hopes to have excuses for walking around.   They should be kept inside his desk.   In that case, no one would move like he does. N: Yes.
E: Let's have him keep his color pencil box inside his desk.
   He was praised by you for his beautiful drawing, but he was coloring all the time while you were speaking.

The experienced teacher advised the novice to stop A from fetching his color pencils, and she informed him of the effect on A caused by the praise.   Even though the cause-effect relationship is uncertain, A continued to color after being praised and did not listen to the teacher from then on.   Thus, the experienced teacher observed and recorded the activity of the novice teacher, and the subsequent reaction of the children.   FRICA allows the novice to reflect on his/her behavior and its effect to children, which the teacher himself cannot notice while teaching.

Next, we examine the reflection regarding a child who had attention in class.   A focused child (B) was recorded by the experienced teacher, and the behavior was conveyed to the novice.   The mentoring session in which they talk about the behavior of B and the way to teach him in a Japanese class is as follows.

> (Viewing the scene of B)
>
> E: Today, B was well engaged in her work. B tends to work better if she is praised by somebody… adult, than when she works all by herself. Look at this. She is not confident of what she is doing. (pointing at B)
>
> N: Yes.
>
> E: So she would work actively if you could stay near her and tell her something like 'you are doing well'. Checking her work continuously would be good for her.

Just as he advised on the target child, the experienced teacher conveyed the behavior of B, who works attentively throughout the recorded video. Although B worked attentively in class, the experienced teacher points out her lack of confidence from her behavior of taking notes. And she also says this is the task the novice teacher should tackle. Thus, the experienced teacher advises the novice in the light of how to interact with and develop children, while observing them. That enables the novice to understand the experienced teacher's perspective, including how to interact with the children, and to utilize the knowledge for his next class.

6. Conclusion

We have reviewed two scenes: the good behavior of children (working hard) and the bad behavior of children to be improved (not working on tasks). The experienced teacher observes children in her own view and gives advice to the novice from her observation during the reflecting session. This allows the novice to improve her teaching method based on the advice. There are some problems as well. Reflecting on the behavior of the target child could mean the novice has to face reality. The novice comments as follows:

> When I see the video of the child, I feel disappointed to know what he was doing, and each reaction of the children is significant enough to make me consider them deeply. Well, I learned a lot from this, but as for the last five times (normal mentoring without using FRICA), it was all about my teaching rather than the behavior of the children. That was quite understandable to me, and I accept the advice naturally. … I know my class.., children. I see and teach them every day. I occasionally think a child is working better than usual, even though he looks idle. But in the video we only notice his laziness, and it is hard for me to decide how to judge his attitude.

The experienced teacher makes comments on both attentive and lazy children. FRICA was created to enable mentoring by focusing on children, and the video shows children accurately as they are. In normal mentoring, teachers tend to focus on teaching techniques and methods, and what the novice teacher is doing in class. By using FRICA, however, the focus is on the children. If the novice teacher faces the negative aspects of children, she might struggle in finding a way to handle the situation. In this way, FRICA could create a challenging situation for the novice teacher by conveying the direct viewpoint and opinion of the experienced teacher.

Finally, the experienced teacher utilized FRICA as a tool for recording by observing a particular child continuously. The experienced teacher commented in the following way.

> If you view the ten video series of A or C, you should notice some changes. Child A was, at first, like this, and now he does it better. I record the class every day at the moment, but if this period is like a month, or longer, you might find target child A in April, to become a well-attentive child by March.

FRICA saves movies of the children in chronological order. So it is possible to track the behavior of a child throughout a whole year. Thus, the capability of FRICA includes a recording tool of children, allowing a reflection of a child of the past period.

We have demonstrated how FRICA is implemented for reflection during mentoring and to gather opinions from a novice teacher. FRICA enables novice teachers to grasp the view of the experienced teacher, and realize the actual behavior of the children. At the same time, excessive reflection of negative aspects could lead to increasing the anxiety of some teachers. As has been pointed out by an experienced teacher, there is also the possibility of utilizing FRICA as a recording tool by improving the system.

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