

## **A Review of Open Education of Mathematics Classroom in Korea**

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In mid 1980s, open education arrived in Korea. It was influenced by the educational reforms implemented in American primary schools. Currently, the Ministry of Education is appealing to teachers for their active involvement in educational reform by using open education methodology. Often teachers in Korea complain that they do not know what to do or how to change in order to practice the open education. It is time to review the state of open education in Korea and the United States.

This paper contains the following segments:

- 0) Introduction,
- 1) Beginning of open education,
- 2) A brief history of open education in Korea,
- 3) The current status of open education in the United States,
- 4) A glance at open mathematics classroom in Korea,
- 5) Lessons from the review, and
- 6) Conclusion

### **0. INTRODUCTION**

Most parents in South Korea tell their children that studying is the easiest work they will ever perform in their lives. This is, perhaps, a misconception. Many people, having gone through the educational system in South Korea, do not agree that their school careers were easy.

In fact, many comments on the undue amount of pressure placed on them to compete with their peers. Many teachers have witnessed the struggle of their students. Teachers are concerned with the growing dissatisfaction from students regarding their education. Teachers heard of students' saying that they obtained neither delight nor joy from their studies and it was this mentality that worries teachers so acutely. How can teachers help

students remain motivated if the morale is low?

The Ministry of Education is trying to solve this problem by implementing the methodology of open education.

However, many teachers are complaining that they do not know what open education means and why they are asked to discard traditional methods. One teacher said that open education in South Korea is simply another way to compel teachers to adopt yet another over-unified teaching methodology. Moreover, he stated that once again the burden of educational revolution would fall primarily on the shoulders of teachers because the teachers who used the new teaching methodology will be identified as the culprits causing discontent in the educational system. No educational reform, which does not include teachers' understanding of the purpose and goal of the movement, can succeed.

This paper is to increase understanding of open education through the brief introduction and history of open education, lessons from experiences of the United States and South Korea.

## 1. BEGINNING OF OPEN EDUCATION

In mid 1960s, American educators discovered that British elementary schools were using informal education (Rothenberg, 1989, pp. 76-77). But development of informal education in England was accelerated in response to a unique situation faced by teachers in London just after World War II. After the war, London schools found that students of the same age had widely varying amounts of schooling and levels of achievement. The teachers in London schools were convinced that education could be strengthened when *different aspects of the curriculum were integrated and were related to ongoing daily activities*. Hull and Featherstone, each of who observed informal education in Britain, introduced this conviction and the teaching effort put forth by British teachers to America. The open education movement began to be evolved in the United States.

Many educators in the United States and South Korea have commented on the difficulties for defining or conceptualizing open education (David, 1975; Egan, 1975; Lee, I. H., 1997; Lee, J. S., 1997). There were many attempts to define open education and revise it, but there is still no consensus. As Hager (1990, p. 13) explained in some respects, the movement is a symptom reflecting an intuitive reaction against the traditional educational process and a general condition within one's society.

Though many definitions were given, Tunnell (1975, p. 17) is helpful for us to understand the fundamental thought of open education. Tunnell defined open education by the form of educational practice, which is characteristically regulated by the following rules:

- 1) Students are to pursue educational activities *of their own choosing*.
- 2) Teachers are to *create an environment rich* in educational possibilities.
- 3) Teachers are to give a student *individualized instruction* based on what he/she is interested in, but they are also to guide the student along educationally worthwhile lines.
- 4) Teachers are to respect students. The following count as exhibiting respect for the student:
  - a) The student is granted considerable freedom. For the most part, he/she is autonomous.
  - b) The student's interests and ideas are considered as important and he/she receives individual instruction and guidance based on his/her interests.
  - c) There is considerable interaction between teacher and student. They are considered to be equal in some sense.
  - d) Students are rarely commanded. Uses of authority are minimized.
  - e) Students' feelings are to be taken seriously.

We can increase our understanding of open education by following the faith of open education provided by Noddings & Enright (1983, pp. 7-10). They identified categories of beliefs and then filled out each one with the open educators' articles of faith:

- 1) Learning is interactive.
- 2) Learning is continuous.
- 3) Learning environment is unbounded.
- 4) Learning is social.
- 5) Learning is transcendent.

According to them, children in open classrooms *interact* with both their environments and their fellow men in order to learn and grow. The child involved in open instruction acts on the world and is acted upon by the world as he or she explores. In accepting an interactive notion of the way in which children learn, the open educator also accepts the notion that what children learn is connected to their own personal experience and provides the setting for further experience. The ideal model for the open educator is one in which a *continuous, dynamic union* between child, teacher, and peers, and the real world takes place. *Unbounded* environments and *social* learning are the notions of children's active and unrestricted participation. Open educators see the child as a *transcendent* whole and learning as surpassing it, and that which can be captured in the responses of the moment.

We are able to know that students' freedom, unrestricted activities, interactions with teachers and amongst each other are focused on in open education much more than in

*traditional education*<sup>1</sup> from both Tunnell (1975) and Noddings & Enright (1983). We can guess what roles the teachers and the students are going to be encouraged to have in the open classroom and why the change of classroom setting named 'open space' is focused on in open education. It is still very difficult to define open education, but if we try to understand it by a program for action or through the faith for learning as above, it is possible to distinguish it from traditional approaches.

## 2. A BRIEF HISTORY OF OPEN EDUCATION IN KOREA

In 1986, educational policy makers in South Korea introduced the methodology of open education, after observing the educational reform taken place in the United States around 1970s. Two primary schools (Wunhyon Primary School and Yeonghun Primary School) in Seoul started the new methodology. By the end of 1980s, open education had pervaded the whole country. In 1995, sixty-three schools, including middle and high schools all over the country, accepted the ideas of open education. And now implement of open education in place is one of the main tasks of the Ministry of Education (Lee, J. S., 1997, p. 37).

Like the decade of the 1970s in the United States, the decade of 1990s in South Korea is an exciting time for supporters of open education. Many supporters (including education inspectors, principals of elementary and secondary schools, teachers and researchers) are trying to actualize the ideas of open education.

In 1991, the Association for Research in Open Education was founded. Since then, many teachers and researchers have worked together and reported the results of their own efforts in practicing open education. Seminars, workshops, conferences and lectures on open education are held steadily all over the country. These supporters of open education published various materials in five key areas (Lee, J. S., 1997, p. 33):

- 1) Writings how to promote open education based upon the existing literature,
- 2) Reports introducing cases from other countries,
- 3) Documents of model schools or classes,
- 4) Experiences of teachers or educational administrators, and
- 5) Materials or resources published by provincial or municipal institutions of

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<sup>1</sup> We need to explain what traditional education means in this sentence. It is possible to think it has the same meaning of 'closed education' which contrasts to 'open education'. But as Tunnell (1975, p. 20) appropriately pointed out we might as well consider 'non-open education' as a logical contrasts to open education, so 'closed education' as one type of 'non-education'. Then in contrasts to open education, so 'closed education' as one type of 'non-open education'. Then it seems reasonable to think that traditional education means education before open education.

education.

Up to 1998, we found that approximately ten master's theses and five doctoral theses are based on open education in South Korea. The first wave of open education has flooded South Korea's shores. We need to consider the statement of Noddings & Enright (1983, p. 186):

“Education is notorious for its swings of the pendulum. Movements are born, backed, bombarded, and buried in relatively short periods of time.”

It is clear how these researchers were frustrated with the marginal effect that introducing various educational theories has had on the American educational system and how this is a reoccurring negative phenomenon in the history of education. Thus we should not examine apparently failed educational movements and not suppose that problems are solved by ridding ourselves of the current theoretical model (now, open education) which is seen as pervasive, does not allow educators to assume that theory actually initiates practical moves. We must keep in mind that trying to effect systematic change in curriculum and instruction is the most important thing in educational movements.

### 3. THE CURRENT STATUS IN THE UNITED STATES

We have learned open education almost exclusively from the United States and more recently from England through research and observation of the model schools. Educators in South Korea are trying to design classroom settings or materials appropriate for our unique school conditions. There are many complicated problems hindering the realization of open education.

In the United States research reconsidering and trying to modify or complement to the open education movement of the 1970s is currently underway and may give us significant food for thought regarding the implications for practicing open education in our schools.

Hager (1990, p. 13) pointed out the reason why the open education movement in the United States failed or had little or no effect toward educational improvement:

Like many other fashionable movements in education, open education is often *put into practice faster* than its advocates wish. That is, the ideas are put into action superficially or judged prematurely. The greatest pitfall is that many teachers and administrators are functioning in the open classroom *without deliberate training*. They echo the ideas *before there is substantial understand regarding the implications and the required behavioral changes*. As a result there are many adverse reactions from educators, parents, and students.

Maling (1990) also surveyed the reports related to the open education movement of

the 1970s the US and concluded as following:

- 1) Without a clear definition, critics were able to claim that *the movement lacked any sort of consistent philosophical grounding and was therefore an unsubstantiated innovation.*
- 2) It seems important to *start small, to plan carefully and to avoid excessive publicity at the outset.*
- 3) It became evident quite quickly that *teaching in an open setting can be more difficult than that in conventional setting*, because the teachers had to deal with a new set of affective issues which were previously unrelated to school activities.
- 4) Without broad-based support by staffs who are committed to maintaining the integrity of the program, *the chances of the program returning to a conventional model are great.*

Barber<sup>2</sup> said that open education and non-graded education would be considered as one and the same (McDonald, 1993, Preface). Barber also said that *current literature is more likely to focus on non-grade* in calls for educational reform. However, those calls for reform include other features of open education, such as continuous progress based on *each individual's developmental readiness, cooperative learning, and team approaches to instruction.*

Keep in mind that theory and practice in education are very different. The thought of open education without deliberate preparing for the real situation cannot resolve educational problems. The following section outlines mathematics lessons that follow open education methodology. One can find similar problems occurring as the ones represented above.

#### 4. A GLANCE AT OPEN MATHEMATICS CLASSROOMS IN KOREA

Two examples of mathematics lessons, one of an elementary school in Gwangju, the other of a middle school in Jinhae, South Korea, are provided in this section. One can find the features of incorporating open education methodology in mathematics classrooms, which give a chance to reflect on the teaching practice, analyze or predict potential problems.

##### ***Case 1: Elementary Level***

Main principle of learning in open mathematics classroom (grade 4) in an elementary

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<sup>2</sup> Barber was the director for the Center for Evaluation, Development and Research (CEDR).

school in Gwangju was individualized learning at their own ability level. The teaching/learning time was about 80 minutes (p.m. 1:30 - 2:50). Theme of instruction was subtraction of mixed numbers. The class was divided into 10 groups and each group had three or four students.

Teaching procedure was as follows (cf. Lee, J. S., 1997, pp. 101-107):

- 1) Creating an atmosphere of learning by singing or using rhythmic movements,
- 2) Reviewing on the previous day's learning,
- 3) Introducing today's theme,
- 4) Proceeding with the teacher's explanation and studying in groups,
- 5) Studying with worksheets which are divided into three kinds: One for students in the highest level named "Giraffe Group", one for students in the middle level named "Deer Group" and one for students in the lowest level named "Squirrel Group",
- 6) Teacher's examining how much students studied with worksheets, and
- 7) Providing enrichment and redemption.

In this class, the teacher's role is as an observer or guide. The teacher encouraged and assisted pupils to work together. The students were very delighted with singing or rhythmic movement in the introduction and with activities in their groups. The teacher and the students participated in the class without any sense of boredom. This is very inspiring since mathematics is one of the subjects many students seem to dislike.

But looking through the following conversation extracted from the above class, some problems are noticeable:

- T: What should we study today in order to know who is heavy?  
 S: (All together) Mixed numbers.  
 T: Right, mixed numbers. We have to learn mixed numbers. What should we study?  
 S: (All together) Subtraction of mixed numbers.  
 T: Principle of subtraction of mixed numbers. Let's read today's topic.  
 S: (All together) Let's inspect on principle of subtraction mixed numbers and understand the algorithm.  
 T: So can we know who is heavy?  
 S: (All together) Yes.  
 T: Let's explore the principle of subtraction mixed numbers. That is what we have to know. After looking into the method, let's calculate.

We can learn from this conversation that the pupils in this class did not choose their learning theme. It is difficult to say that the pupils interacted with the teacher in the way open education. Neither do they discuss with one another nor make sense of the theme for themselves. The teacher and the pupils still depend on their textbooks and explanations, not on their interactions or discussions among students for teaching and learning.

Evidently, there is some deviation from the teaching/learning methodology of open education. The teacher used new methods which are not used in the conventional mathematics classes like singing or rhythmic movement to increase motivation, extending learning time, grouping children, etc. But the teacher failed to allow students to develop their own intrinsic motivation. Activities were connected to the learning content, however the teacher used conventional methods such as giving explanations and inducing short or 'yes or no' from the class. Pupils were still asked to repeat and memorize algorithms or concepts in order to learn them. The return to traditional education would not be a mistake. But if it occurs in the core steps of instruction and the teacher depends too much on it, one can oppose the idea that open education can give a new direction for mathematics education, can improve the quality of our mathematics education or can help children enjoy mathematics. If this continues one may discard the idea and seek other theories or methods.

### ***Case 2: The Jinhae South Middle School***

The Jinhae South Middle School, which is under private management, has thirty-three teachers and twenty-one classes. It has put into practice open educational methodology since 1996 when five teachers became involved in workshops that focused on open schools and classrooms. The principal of the school encouraged teachers to put open education into practice as much as possible. Mathematics, science and physical education were the subjects they tried to practice open education first.

The philosophy of mathematics teachers trying to practice open education at the school, was based on the premise or the requirement that (cf. Kim, D. W., 1997, pp. 161-176):

- 1) Children learn best by working at their own ability levels.
- 2) Teaching materials must be designed with consideration of individual differences between students' ability.
- 3) Detailed goals, broken down into specific learning goals, must be provided in order to allow every student to become a successful learner.
- 4) Learning in open spaces is helpful for most students.
- 5) Diverse activities instead of only listening are necessary.
- 6) Teachers have to act as facilitators of learning.
- 7) A shift from result-centered assessments to the process-centered ones is encouraged.

The mathematics teachers developed teaching/learning principles as shown in Table 1. Education theorists and researchers in various workshops in open education gave many



teaching methods like as in Table 1. However, these methods are not specific to mathematics, only the results of teachers incorporating the methodology of open education in mathematics classrooms.

**Table 1.**  
*Teaching/learning principles*

Principles	Activities or steps for each principle
Individual-paced	<ul style="list-style-type: none"> <li>· Divide lessons into four steps:               <ol style="list-style-type: none"> <li>a) Discovery of problem,</li> <li>b) Planning to solve the problem,</li> <li>c) Solving the problem, and</li> <li>d) Drawing the result.</li> </ol> </li> <li>· Slow learners are to perform a), b), c) with teacher's help, d) for themselves.</li> <li>· Learners at the middle level are to perform a), b) with teacher's help, c), d) without help.</li> <li>· Fast learners are to perform a) with help, the remainder without help.</li> </ul>
Flow chart	<ul style="list-style-type: none"> <li>· Provide a flow chart of the lesson on the blackboard of classroom and urge pupils to follow the steps:               <ul style="list-style-type: none"> <li>Introducing ▷ Diagnostic test ▷ Whole class learning</li> <li>▷ Individual learning ▷ Formative test ▷ Selected learning</li> <li>▷ Adjustment</li> </ul> </li> <li>· Pupils learn using the flow chart under their own control.</li> </ul>
Self-progress task	<ul style="list-style-type: none"> <li>· Teacher gives individualized tasks which allow students to study before and after lessons.</li> <li>· Students have weekly or monthly planning tables of their learning and engage in tasks prepared for the student's level.</li> </ul>
Extra-course after school	<ul style="list-style-type: none"> <li>· Students have accountability for their learning.</li> <li>· When students have any problems with learning, they can ask for help from their teachers. They can also study after school in their classrooms.</li> <li>· Fast learners also ask teachers to help them in order to move to higher levels.</li> </ul>
Worksheets made by teacher	<ul style="list-style-type: none"> <li>· Teachers have to make worksheets considering differences of mathematical ability and attitude to the subject.</li> <li>· Easy and context-rich worksheets are provided.</li> </ul>
Tools & materials	<ul style="list-style-type: none"> <li>· VTR, OHP, slide projectors and personal computers are useful for active learning.</li> <li>· Provide Puzzles or games that incorporate the solution of difficult problems</li> <li>· CAI program of mathematics.</li> </ul>

While the idea of open education is gaining in popularity, many methods like the above were designed for open mathematics classroom and pervaded rapidly without theoretical inspection. Sometimes general methodology of education is helpful to the instruction of special subjects, but often there is a danger of change or distortion of meaning since the focus easily shifts from the didactical contents itself to the classroom equipment, activities and materials.

In fact, the above example requires too many things for one teacher to cover. We have no deliberate training courses for teachers to prepare open mathematics classes, yet. Dividing a class into groups, encouraging self-directed learning and interaction among students, guiding pupils through different courses, understanding the concept of students' special mathematical knowledge are very difficult problems that have run through the history of mathematics education. These can be mediated through the use of professional and institutional support. We need to develop the systematic and carefully thought-out models specific to mathematics. Through these efforts we can improve our mathematics instruction and open education can settle down successfully into all mathematics classrooms.

## 5. LESSONS FROM THE REVIEW

As we examined in the above section, few methods were given especially for open mathematics classroom so far. Thus most of mathematics teachers interested in open education seemed to have difficulties to continue the approaches. They often used ways for other subjects or returned to conventional methods (Kim, D. W., 1997). We need to find various methods especially appropriate for mathematics instruction.

It is difficult to decide on the criteria for creating worksheets, especially to devise written activities that pertain to every level of mathematical concepts. It was equally difficult to organize the worksheet material so that students could move from level to level at their own pace while allowing the teacher to assess the students' progress using both quantitative and qualitative means and including the students' self-assessment responses. These activities could not be controlled adequately by one teacher alone. Therefore, without extra time and assistance, the teacher was unable to provide individualized or differentiated learning. So he/she remained at the whole-class learning level found in the traditional approach.

Although a reward and competition system drew active participation from students, teachers found it difficult to constantly consider the interests and experiences of the students when devising such systems. Another concern was that low achievers who are involved in a highly competitive classroom atmosphere might develop emotional problems. Since teachers and students were still subjected to public examinations, it was

difficult to completely alleviate competition in the classroom. Therefore, the teacher's interventions, however well intended, could not be realized. Thus many teachers who are currently introducing open methods in mathematics lessons in South Korea seem to use the methods not as an encompassing methodology, but rather, choose various principles they feel comfortable with, or that can easily be adapted into the classroom environment. It is doubtful that this picking and choosing behavior is effective in implementing open education theory and practice into the classroom.

Therefore, teachers who are trying to practice open education principles in their mathematics lessons in South Korea, are modifying the main learning principles based on their own perception of their environmental situation. This practice changes the foundation on which open education was developed. In turn, it changes the effect in the classroom. Providing large amounts of open space, making differentiated worksheets, and designing reward or competition systems are often considered as critical objectives, but problems focussing on exploring mathematical concepts or algorithms are barely considered. In this case, the main job of the teacher is more centered on preparing the many external conditions needed for instruction and excludes an analysis of mathematical concepts.

## 6. CONCLUSION

In the early days of open education in South Korea, there were general guidelines given to teachers for implementing new methodology in classrooms. However, currently there are many concrete teaching methods being advocated in several ways.

Many teachers, who were initially unfamiliar with constructs of open instruction, have found the new assertions about open education extremely confusing. At times, open education is judged as superior to the traditional approach. Moreover, it is asserted that teachers who use open education methods in their classrooms are innovative and are putting forth their best efforts to help their students, while teachers who continue with the traditional method are labeled lazy. A teacher in South Korea who is devoted to the South Korean educational system is placed in a difficult situation of having to choose a philosophical stance on an emotionally charged issue.

A change does not always imply an improvement. In fact, it is not clear how open education is new and different from traditional education methods. But as a teacher and a researcher it is difficult to refuse at least attempting to understand the theory on which open education is based. And it is doubtful that open education is generally understood by whole community of teachers in South Korea since there are many uncertain theories and vague suggestions proposed to teachers by advocates of open education in the United States in the 1970s. Teachers need to understand the followings:

- 1) The motivation behind incorporating principles of open education into the school curriculum.
- 2) How these changes will affect teaching and learning, and
- 3) The possibility of these changes being implemented into the school curriculum successfully.

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