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Students' Outcomes of Implementing Knowledge Exchange Teaching Method in the Classroom: An Action Research

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Abstract

Knowledge exchange method teaching is a growing trend. The main objective of this work to see the effect of knowledge exchange method teaching in the mathematics classrooms and thus sees its outcomes in terms of learning and classroom environment. Action research was adopted for this study. Four cycles were implemented with the focus of different contents in each cycle. Each cycle lasted for a week. The data was collected through observation and students interview. The results showed significant improvement in their classroom learning environment as well as in learning. The students felt enthusiastic about the new teaching methods and were eager to participate. It is recommended that teachers should be trained to implement the knowledge exchange method in the classroom.

Keywords: Students Outcome, Knowledge Exchange Method, Students Centred Learning

Introduction

Student-centred, learner-centred approach is a popular concept among teachers and students, especially, in the period of educational reform in our country since 2006. While the status of student-centered learning exists a large number in the literature, the definitions of the teacher-centred approach are becoming more confused with other teaching methods, focused learning, collaborative learning, autonomous learning self-directed learning, and independent learning is the examples (Sparrow et al, 2000).

Nanney (2003) suggested that the student-centred approach is "providing an active and cooperative group environment, finally it providing responsibilities of the students for his advances in education". According to Tudor (1993) in student-centred learning students are observed more active. Harmon and Hirumi (1996) confirmed that students become more active learners in student-centred learning to solve the problems rather than passive learners". Further said that " in a student-centred approach, teachers become mentors, facilitators and guide for students access, transfer knowledge and to solve problems authentically, while students become experts not only in the relevant area studied in the class, but also in how to learn by inquiry, discovery and problem solving". According to McCombs, Whistler (1997) the student-centred learning approach pays particular attention to individual learners and learning activities. According to Gibbs (1992) cited in Sparrow et al, 2000) that student-centred learning "provides the choice of subject matter to the students in highest autonomy and control." three main characteristics were suggested of student-centred learning, that how, when and what is learned. This definition shows the responsibility of the students in the learning environment and selecting their aims of their learning process (Sparrow et al 2000). According to Nonkukhetkhong et al (2006), "student-centred approach" puts more responsibilities to the students for their learning. The change of traditional learning is the cry of the day, to facilitate the students' knowledge and to teach to the students for promoting students' learning. Similarly, Matsau (2007) explains the student-centred focusing on student's needs, what and how they learn, and the condition that enhances their cognitive abilities.

Student-centred learning identified the primary characteristics as follows: firstly, the students' needs are discussed in a student-centred approach (Pillay, 2002), responsibility and capacity to learn

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effectively are also discussed (Hedge, 2000) to provide the students sufficient environment for learning activities (Nunan, 2002). Secondly, in Student-centred learning active learning atmosphere context among students and teacher are also provided (Watanabe, 1999). Thirdly, the student-centred learning approach makes both the effective, teaching process and learning of the students. Fourthly, the role of the teacher must be a facilitator, not a lecture giver (Pulist, 2002). Stanford (2001) confirmed that the effectiveness of teachers can achieve desired goals upon students. In another way, teacher effectiveness can be evaluated that how much students achieve their learning goals. In Mathematics teaching, practices are thought which results best understanding of students. The majority of Mathematics teachers are more effective in teaching than other subject teachers (Larson, 2002).

To create a better understanding of achieving the aims and knowledge exchange, it is important to know the student's requirement (Riege, 2005). Knowledge sharing is a continuous process containing steps. Many factors are involved in the knowledge Exchange process (Riege, 2005).

Many researchers said that knowledge is connected to individuals rather than to organizations (e.g. Desouza, 2003; Chen & Huang, 2007). Desouza (2003) stated that the most important factor is that a learner shares her or his knowledge for achieving goals. The individuals must be motivated in an organization that provides the capacity to share knowledge among them (Tsai, 2001). Jonsson (2012) narrates that corporate culture has a deep impact on knowledge exchange. In 1970s Denrell, (2005) introduced cooperative teamwork for developing the learning competencies in science and laboratories. According to Cohen (1994) cooperative learning has been provided as a teaching strategy that develops learning skills. In cooperative learning, students share their knowledge in good manners to achieve their goals (Lazarowitz & Hertz-Lazarowitz, 1998; Levitt, 2002; Lin, 2006; Treagust, 2007). Cooperative learning creates a sense of group in the students for supporting each other's in learning (Gillies, 2002; Slavin, 1995). When students are in the classroom or outside, they learn to share ideas and give help to each other. Gillies (2003b), Webb and Troper & Fall (1995) narrate that when students listen to each other, their problems in groups are resolved and they construct new understandings in groups. According to Okebukola (1985) that there are three main ways in which students can work together, competition, cooperation, and collaboration.

Several reviews reveal that students centred learning is very effective in students' outcomes e.g Dorman, 2002; Fisher & Khine, 2006; Fraser, 1986, 1994, 1998a, 2002, 2007, in press; Fraser & Walberg, 1991. In this regard, the productive combination of quantitative and qualitative research methods were used within the field (Tobin & Fraser, 1998). Research has shown that if you want improving student outcomes you must pay attention in terms of cooperation and collaboration (Fraser, 2001). According to Jackson (1968), every student spent about 7000 hours in classrooms by the end of the elementary level. The title of Rutter, Maugham, Mortimore, Outson, and Smith's (1979) book shows that every student study 15,000 hours up to the secondary level. Students have great interest that what happens to them at school. According to Fraser (1989), that the classroom atmosphere affects the students learning process in science and mathematics.

Objective of the Study

The main objective of this work was to find the outcomes of implementing the knowledge exchange teaching method in the classroom.

Research Methodology

The action research method was used. In action research, there are four cycles for data collection and analysis. Each research cycle contains four steps plan, acts, observes, and reflect (Kemmis and Mc Taggart, 1988), each cycle consist of 25 teaching session of an hour for four weeks.

Research Cycles

Four research cycles were implemented in periods of four weeks. Two main topics addition and subtraction were focused in the first week. The students were divided into three groups and the activity was given to the students for solving the questions.

I started the second week with Multiplication in which the aim was to add different numbers in front of the class and can explain the addition process in detail.

I started the third week to focus on reviewing the basic things that students should know the multiplication. They can multiply different numbers with each other and also know that which we keep in mind while we are doing the multiplication.

After practicing the table I jumped out to the Highest Common Factor and Least Common Factor.

Data Collection

Students' work was based on their target work performance and research outcomes, so for collecting data some methods were used for increasing the credibility of the obtained data (McMillan & Schumacher, 2001).

At the end of every research cycle, the data was collected from the students' performance, a teacher's journal, an observation, and a group interview.

Analysis

After data analysis in cycles through interview and observation, the data is analyzed as follows

Table 1: Performance of students in basic operations.

S.No	Observed behaviors	Number of observed students (N=30) all boys
1	Try to convert the numerals in words	7
2	Being observed words in numerals working in a group.	6
3	The place values of the digits in numbers presenting in front of the classroom was observed.	8
4	Be able to understand addition and subtraction of different numbers	16
5	Actively participate in learning activities.	20
6	Understand multiplication and division	15
7	Knowledge of HCF	10
8	Can find out the HCF By factorization and division method	11
9	Can find out the LCM by common factorization method	13
10	Can find out the LCM by prime factorization method	14

The first cycle shows that few students showed improved out of a class of 30 students and indicated that students were new to the environment and may improve further in the next cycles.

Concerning addition and subtraction, I was very happy that students show performances in two skills addition and subtraction. More than 50% of all students in the class who can solve the questions related to the addition and subtraction.

Table.2: Performance of students (the comparison of cycle one and two)

S.No	Observed behaviors	No of students (N=30) 1 Boys	2 Boys
1	Know about the fraction	7	**11**
2	Can write the type of fraction	6	**10**
3	Can convert the mixed fraction to improper fraction	8	**11**
4	Can add the different types of fraction	10	**13**
5	Can Subtract Fraction	12	**15**
6	Can multiply the proper and improper fraction	12	**14**
7	Can multiply compound fraction	7	**12**
8	Know the procedure of division of fraction	11	**17**
9	Can Divide the proper and improper Fraction	12	**16**
10	Can Divide the proper and improper Fraction	13	**15**

The second research cycle shows an improvement in students' performance. The summarized data in Table two showed that the number of 11 students which increased from seven was observed trying to work on Fractions, the number of 10 students were increased from six students that knew about the fraction and its type, working or sharing ideas in a group.

Table 3: Performance of students in Decimals in Research cycle three

Item	Observed behaviors	No of observed students (N=30) Cycle –I	Cycle –II	Cycle -III
1	Add and Subtract decimals	7	11	20
2	Recognize like and unlike decimals	6	10	16
3	Multiply decimals by 10,100 and 1000	8	11	21
4	Multiply decimals with a whole numbers	10	13	20

5	Divide decimals with a whole number	12	15	19
6	Multiply decimals by 10^{th} and 100^{th}	12	14	22
7	Multiply decimal by decimal	7	12	18
8	Divide decimals by decimals	11	17	18
9	Divide decimal by decimal using the direct method	12	16	19
10	Use division to change fraction into decimals	7	11	20
11	Simplify decimals using expression involving brackets	13	15	21
12	Round off decimals	10	12	22
13	Convert fraction to decimals and vice versa	11	15	12
14	Solve real-life problems involving decimals	12	14	19
15	Convert percentage to fraction and decimals and vice versa	14	17	18

Students' performance besides to decimals improved from research cycle two. The numbers of 20 students (increased from 11) were noticed while in recognition of like and unlike decimals the number of 16 students (increased from 10). The remaining students show a little bit of improvement at all. Students' skills improved gradually by practice the target work in knowledge Exchange Method.

Table 4: Performance of students (the comparison among cycles)

Item	Observed behaviors	No of observed students (N=30)			
		Cycle -I	Cycle –II	Cycle -III	Cycle –IV
1	Know angle and its type	7	11	20	22
2	Can measurement an angle	6	10	16	21
3	Can construct an angle	8	11	21	23
4	Triangle and its type	10	13	20	25
5	Differentiate the types of triangle	12	15	19	23
6	Construction of triangle	12	14	22	24
7	Circle, square and rectangle	7	12	18	27
8	Construction of rectangle	11	17	18	21
9	Construction of Square	12	16	19	21
10	Construction of circle	7	11	20	23
11	Know the formula for Area and perimeter	13	15	21	25
12	know formulas to find Perimeter of square and rectangle	10	12	22	24
13	Know formulas to find area of square and rectangle	11	15	12	23
14	Solve appropriate problems of perimeter	12	14	19	25
15	Solve appropriate problems of area	14	17	18	20

Performance of Students

The above table shows the improvement of student item wise step by step in each cycle. The students show excellent performance in item number 4, 7, 11, 14, 21, and 23 students while good performance was shown by the students in the remaining one. Besides, the students presenting their work in front of the class, these 22 students (increased from 20). Just five students were seen active when they work in a group and show their efforts.

Conclusions and Recommendations

The research question was that what are the outcomes of implementing a student-cantered approach in the classroom?

It was observed that an active learning environment than the past one was started after research. However, the students' performance in this research cycle did not improve significantly. Furthermore, considering the cycle data I was forced to realize that students need to learn and practice with a wide range of topics during the week and that they were facing difficulties.

The teaching arrangements were adjusted with the help of research cycle one, the learning topic was reduced to promote the student's practice in mathematics. In this regard, the activities were brought for the student's motivation and encouragement. The presentation was made in front of the class

Most students paid good responses to the new approach. In every learning activity, they collaborated well. Moreover, the students also asked for help outside the classroom which brought changes in teacher and students' good relationships. The majority of the students improved both in

confidence and learning content at the end of research cycle two. Moreover, in learning mathematics, the students were observed happier and more active.

Students' work was promoted in the third cycle. From hand-outs the students worked and practice with each in the classroom, their work in a group and pair was encouraged. Learning in pairs and groups by him was not easy for the students, but it made me happier when I saw them tried to complete the tasks.

Almost half of the students were noticed that worked with more confidence than at starting. Many students showed their performance in doing their target work in research cycle three. In applying the appropriate teaching method make me feel more confident to develop my students' competence.

The majority of the students were transformed from passive learners to active learners during the implementation stage. Moreover, not only their performance improved but also a positive attitude toward learning Mathematics was observed. In most activities, the students collaborated well.

Research cycle four showed the improvement of Students doing their work in front of the class. Students were able to present their work in front of class due to gained confidence during student center teaching.

It is recommended that in-service teachers must be trained and a supportive learning environment must be provided to students.

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