

Ability Grouping: Is it better for mathematics classroom?

- Binita Kharel

Abstract

This article concerns on ability grouping and mathematics classroom which is one of the most contentious issues in the present scenario. The purpose of the paper is to present argues on ability grouping in mathematics classroom in the context of Nepal. To address the mentioned purpose the author used the systematic literature review approach. Author presented different arguments and evidences based on different journal articles, books, essays dissertations and own teaching experiences. Presented arguments concluded that mathematics class without ability grouping instruction is positively impact on the academic performance of the students. It is hoped that the article assist to change the attitude of the concerned people toward ability grouping in mathematics classroom. The findings of this article would be useful implications for mathematics teacher students, as well as it opens the door to start a discourse on the ability grouping in mathematics classroom.

Keywords:

Ability grouping, homogeneous grouping, heterogeneous grouping, cross-year subject grouping, between- class ability groupings

Introduction

The aim of mathematics education is to impart mathematics knowledge easily to all the pupils. Practically, it seems that only few students get success and greater number of students finds mathematics as a difficult subject (Tall & Rajali, 1993). The reasons behind considering mathematics as a difficult subject by most of the students are due to unpleasant teaching style of teachers lacking of interaction between teacher and students, lacking of conceptual knowledge, and abstract nature presents on the subject (Gafoor & Kurukkan, 2015). Similarly, mathematics teachers have been using the lecture method of teaching that overemphasizes algebraic manipulation and procedural skill which can not address the aim of mathematics education. Mathematics instruction requires students not

only use of problem solving skill but also critical thinking and exploration. Different teaching techniques and strategies have been used by teachers to make the mathematics teaching and learning meaningful. For this very reason, whole group instruction characterized by the utilization of a traditional, textbook-dominated curriculum cannot be an exclusive teaching tool. Students must be provided the environment where they can share content skill and practice of social skill in small group in an academic setting (Taylor, 1989).

Ability grouping is defined as a practice where students are kept in a small groups based on their previous academic performance or readiness or ability (Kulik, 1992). Ability grouping involve assigning students based on their prior achievement or ability levels (Loveless, 2013). Steenbergen-

Hu et al. (2016), defines ability grouping as an instructional method with three features: create homogenous learning environment; classify students according to their previous performance; the classification is temporary.

Theoretically, ability grouping enhances student performance by reducing the disparity in student ability levels and providing the appropriate instructional procedure according to the nature and target of the group, allows the teacher to increase the pace and raise the level of instruction for high achievers, and to provide more individual attention, repetition, and review for low achievers (Hollifield, 1987). The question that is most often considered when grouping for mathematics instruction is how to arrange student classes and groups for maximum student achievement and growth. In this context, the practice of sorting students according to ability continues in many countries in teaching mathematics meaningfully. However, ability grouping alone will not be sufficient to improve students' achievement unless it is combined with curricula based on students' learning styles, interests, and abilities (Tieso, 2003).

Methodology

The purpose of the study was to present argues on ability grouping in mathematics classroom is meaningful or not in the context of Nepal. The systematic literature review approach was used to summarize the relevant articles and critically analyze previous empirical studies (Grant & Booth, 2009). To address the purpose of the study, researcher consulted the journal articles, books, seminar papers, international encyclopedia, and few dissertations related to the problem of the study. The researcher used some of the Google search engines: Google and Eric to collect the research articles, books

and other related materials.

Result and Discussion

Ability grouping practice was started widely in school of U. S., Australia, England, and other countries from the end of 1960. But in case school of Japan, England, countries of Pacific Rim, and some countries of Europe, have moved away from the teachers and parents as they believe that this system encourages inequity and negatively impact on children's self-image, socialization patterns, and academic competition (Bracey 2003).

The ability grouping has more advantages over whole group instruction where students move through curriculum without prior knowledge, interest, and level of readiness (Good & Power, 1976). The high achievers benefit due to compete with high achievers, and the low achievers have no pressure and gets individual instruction by teacher. Steenbergen-Hu et al. (2016) have divided the ability grouping into four categories: between- class ability grouping; within-class ability grouping; cross-year subject grouping; grouping for pupils considered gifted.

As an author of this article, I searched using Google and Eric to find the any researches on ability groping instruction in mathematics classroom in Nepali context, unfortunately, I could not find. But knowingly and unknowingly, the practice of grouping students according to their previous achievement has been popular in Nepali context as the author herself is a mathematics teacher. Further, the author conducted not the exactly same but similar study on the effectiveness of group work teaching technique in mathematics class at secondary level where she had stratified the mathematics class into homogeneous group in mathematics ability and appointed a tutor in each group. After experiment, she concluded that this practice

was effective in mathematics class (Kharel, 2007). On the basis of my experience as a mathematics teacher and M. Phil scholar, the ability grouping practices have become more common in institutional and public school of urban schools where numbers of students are more as compared to both types of school of rural area due to financial condition and physical infrastructure of the school. Policy makers have regularly supported the practice and many parents support it, yet research consistently tells us that ability grouping has no academic benefits and severe negative consequences for children's development (Hollifield, 1987).

Ability grouping has been considered as one of the most controversial instructional practices for more than a century. Bowles & Gintis (1976), states that the practice of sorting and grouping students on the basis of their perceived ability has long been questioned by educational researchers. Research studies on the ability grouping instruction have provided evidence to inform this question in different subject areas including mathematics in various countries but could not find the conclusive result. This implies the continuous debate on the effectiveness of ability grouping instruction in mathematics class. There is a deeply held belief among the supporters of ability grouping that it raises educational performance of the students. However, the researches around this topic suggest that there is no such relationship between ability grouping and mathematics performance of students. For example, the supporters of ability grouping instruction argue for its important in addressing the educational needs of students with prior achievement, skills, or abilities vary greatly (Tieso, 2003). On the other side, the opponents argue that ability grouping creates achievement gaps and lowers the self-concept or self-esteem of

lower achieving students (Belfi, 2012).

On this continuous long debate on the effectiveness of ability grouping instruction in mathematics class, my position as a mathematics teacher and educator is very near to the opponents. I think the practice of grouping students according to their prior performance creates classes permanently although the sorting of students in a group is temporary process. I agree with Slavin (1990) who accepts that ability grouping creates academic elites and is a practice which goes against democratic ideals. For example if two students with identical mathematical ability are assigned for long time to two ability groups with different participants and styles of interaction then both of them will have different mathematical knowledge. Marsh et al. (2015), claimed that students in a more competitive and selective academic environment may result in a loss of self-concept which may impact negatively on future academic career of the students. Similarly, Boaler (1997), argue that working class homes and ethnic and cultural minority groups are generally kept in lower achievers group while grouping according to ability can serve to enhance educational inequalities. Thus it is concluded that how much care will be taken while sorting students in groups, the process of grouping creates classes and encourages the inequity.

On the other side (Oakes, 1986), concluded that the academic performance of students assigned to ability grouping is better than those of students who are in heterogeneous group. This argument has been countered by the finding of Fuligni et al. (1995) that low achieving students placed in low-level math classes perform worse than students who are not grouped. As opponents of ability grouping, Chen & Goldring (1994) in Linchevski, & Kutscher (2016) found

that many teachers have positive attitude toward the grouping of students according to their academic performance. This result is absurd when observing the result of Rubin (2008) indicates that most of the teachers and administrators who believe in ability grouping have negative attitude toward it and says this process create more damaging learning environment for disabled and economically disadvantaged students. Brady (2010) claimed that when we sort lower-achieving students with higher-achieving students this impact positively on the performance of the high-achievers. It means that the class of students without ability grouping positively impact on the academic performance of the students. Opponents of ability grouping suggest that it enhances social development of high-achieving students while assists lower achieving students to increase self-esteem, confidence, leadership opportunities, motivation, and educational benefits (Adams Byers et al., 2004).

Conclusion

Different teaching techniques and strategies have been used by teachers to make the mathematics teaching and learning effective. For this very reason, ability grouping in mathematics class instruction is contentious issue in present scenario for the better performances in the field of mathematics pedagogy. I have reviewed different research on the related issue in terms of equity, achievement effects, and pedagogy. Ability grouping practice was started widely in school of U. S., Australia, England, and other countries from the end of 1960. The grouping practice according to students' prior knowledge has been in practice although this issue is new in context of Nepal. Ability grouping is a practice where students are kept in small groups based on their previous academic performance which

reduces the disparity in student ability levels and providing the appropriate instructional procedure according to the nature and target of the group. The ability grouping can be done in four ways: between-class ability grouping; within-class ability grouping; cross-year subject grouping; grouping for pupils considered gifted.

Ability grouping has been considered as one of the most controversial instructional practices for more than a century. The practice of grouping students on the basis of their perceived ability has long been questioned by educational researchers. The supporters of ability grouping instruction believe that it raises educational performance of the students. However, the researches around this topic suggest that there is no such relationship between ability grouping and mathematics performance of students. The teachers and parents who oppose the ability grouping believe that the process of instruction encourages inequity and negatively impact on children's self-image, socialization patterns, and academic competition. My position as a mathematics teacher and educator is away from ability grouping instruction. I think the practice creates classes permanently. I am with Slavin (1990) who accepts that ability grouping creates academic elites and is a practice which goes against democratic ideals. Thus, stop grouping students according to their performances and let us make heterogeneous classes where students of different ability group can competitively by sharing their knowledge and enjoying the equity in mathematics classes.

Author's Biography:

Binita Kharel is a teaching assistant of Butwal Multiple Campus, Rupandehi. She is interested in conducting research in mathematics education. She has published different journal articles on reputed journal.

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References

- Adams-Byers, J., Whitwell, S., & Moon, S. (2004). Gifted students' perceptions of the academic and social/emotional effects of homogeneous and heterogeneous grouping. *Gifted Child Quarterly*, 48(1), 7.
- Belfi, B., Goos, M., De Fraine, B., & Van Damme, J. (2012). The effect of class composition by gender and ability on secondary school students' school well-being and academic self-concept: A literature review. *Educational Research Review*, 7, 62–74.
- Boaler, J. (1997). Setting, social class and survival of the quickest. *British Educational Research Journal*, 23(5), 575-595.
- Bowles, S., & Gintis, H. (1976). *Schooling in capitalist America: Educational reform and the contradictions of economic life*. Basic Books.
- Bracey, G. (2003). Tracking, by accident and by design. *Phi Delta Kappan*, 85, 332–333.
- Brady, F. (2010). *The influence of inclusion on language arts literacy and math achievement on non-disabled middle school students*. [Unpublished doctoral dissertation]. Seton Hall University.
- Gafoor, K. A., & Kurukkan, A. (2015). Why high school students feel mathematics difficult? An exploration of affective beliefs [Paper presentation]. *Pedagogy of Teacher Education: Trends and Challenges*, Conference, 2015. , Kerala, India. <https://www.researchgate.net/publication/305809555>
- Good, T. L., & Power. (1976). Designing successful classroom environments for different types of students. *Journal of Curriculum Studies*, 8, 1-16.
- Grant, M. J. & Booth, A., 2009. A typology of reviews: An analysis of 14 review types and associated methodologies. *Health Information & Libraries Journal*, 26, 91-108.
- Fulgini, A. J., Eccles, J. S., & Barber, B. L. (1995). The long-term effects of seventh-grade ability grouping in mathematics. *Journal of Early Adolescence*, 15(1), 58-89.
- Hollifield, J. (1987). *Ability Grouping in Elementary Schools*, 1–4. Eric Digest.
- Kharel, B. (2007). *A Study on the Effectiveness of Groupwork at Lower Secondary Level* [unpublished master thesis]. Tribhuvan University.
- Kulik J. A. (1992). *An analysis of the research on ability grouping: Historical and contemporary perspectives*. CT: National Research Center on the Gifted and Talented.
- Linchevski, L., & Kutscher, B. (2016). Tell me with whom you're learning, and I'll tell you how much you've learned: Mixed-ability versus same-ability grouping in mathematics. *Journal for Research in Mathematics Education*, 29(5), 533–554.
- Loveless, T. (2013). How well are American students learning? The 2013 Brown Center report on American education. Washington, DC: Brookings Institution.
- Marsh, H. W., Abduljabbar, A. S., Morin, A. J., Parker, P., Abdelfattah, F., Nagengast, B., & Abu-Hilal, M.

- M. (2015). The big-fish-little-pond effect: Generalizability of social comparison processes over two age cohorts. *Journal of Educational Psychology, 107*, 258–271.
- Oakes, J. (1986). Keeping track, part 1: The policy and practice of curriculum inequality. *Phi Delta Kappan, 68*(1), 12-17.
- Rubin, B. (2008). Detracking in context: How local constructions of ability complicate equity-g geared reform. *Teachers College Record, 110*(3), 646-699.
- Slavin, R. E. (1990). Achievement effects of ability grouping in secondary schools: a best evidence synthesis. *Review of Educational Research 60*(3), 471-499.
- Steenbergen-Hu, S., Makel, M. C., & Olszewski-Kubilius, P. (2016). What One Hundred Years of Research Says About the Effects of Ability Grouping and Acceleration on K–12 Students' Academic Achievement: Findings of Two Second-Order Meta-Analyses. *Review of Educational Research, 86*(4) <https://doi.org/10.3102/0034654316675417>
- Tall, D., & Razali, M. R. (1993). Diagnosing students' difficulties in learning mathematics. *International Journal of Mathematical Education in Science and Technology, 24*(2), 209–222. <https://doi.org/10.1080/0020739930240206>
- Taylor, R. (1989). The potential of small group mathematics instruction in grades four through six. *The Elementary School Journal 89*(5), 633-642. <http://www.jstor.org/discover/10.2307/1001727?>
- Tieso, C. L. (2002). *The effects of grouping and curricular practices on intermediate students' mathematics achievement*. CT: National Research Center on the Gifted and Talented.