

Constructivist Teaching Practices: Science Middle and Secondary School
Teachers- A Survey Research

Rachel Padma Star
University of Cincinnati
2920 Scioto Street, Apt 813
Cincinnati OH 45219
starr@email.uc.edu

The following proposal is for a study that will examine how often do science teachers use constructivist practices in their classrooms. It will more specifically look at when teachers use constructivist practices during their whole class time. Like, do they use during presenting new information, learning activities or assessment. After a discussion of the rationale for the study, the following questions will be discussed on light of current educational research: (1) what is constructivism? (2) Constructivist teaching practices (3) Constructivist teaching Vs Traditional teaching (4) how can "use of constructivist practices" facilitate learning? This discussion will be followed by a brief explanation of the constructivist learning theory through which the survey instrument will be constructed. This will be then be followed by a review of methodologies from recent, similar studies and my own methodological plan.

Rationale:

The increased focus on use of constructivist instructional models as an agent of reform in science education has resulted in a great deal of research. Science education is facing yet another wave of reform efforts. One major recommendation of these reports is the use of constructivist instructional models. Most of the studies on these areas, however, are beliefs or perceptions of teachers on constructivist practices and a very few studies which really looked into the current practices which are consistent with constructivist teaching practices. Constructivist theory has also generated a significant body of empirical data, which has led to greater understanding of how learning in science takes place (Osborne, 1996), Black and Lucas (1996) referred to this body of research as the dominant research movement in science education. Research suggests that most teachers learn to teach in a traditional manner. Reforms need to focus on developing teacher's knowledge and skills before they focus on the changing structure. As more studies are conducted on beliefs are perceptions of teachers and students on constructivist practices and strategies in the classrooms, there is need to look at the current practices used in the classrooms, which are consistent with constructivist practices.. If educators fail to look at the current instructional practices in the classrooms, these reforms would never make sense. It would seem to defeat the purpose of preparing new teachers with exposing to the idea of an effective teacher. By studying the current practices used by teachers in the classrooms, educators can better understand not only the evidence of using constructivist practices, but also the ways to improve the methods courses in teacher education programs.

Purpose of study:

Because of the rationales stated previously, I believe there is a need for more research that explores the current practices used in the science classrooms. This is true because, to develop effective practices based on constructivist practices, it will be important to conduct studies in classrooms where instruction and assessment strategies are consonant with this model. School reformers today all for a shift from traditional "teacher-at-the-front practices to one that focuses on student's meaningful intellectual involvement in the development of knowledge. In other words, from transmission of knowledge to student constructed knowledge. The second important purpose of study is philosophy of teaching. Educational curricula and teaching methods are changing. One component of the current redevelopment of all subject area curricula is the change in focus of instruction from transmission curricula to transactional curriculum. Because of these reasons, for my dissertation, I have decided to study the current practices in the science classrooms. My main research questions, "How often do science teachers use constructivist practices in their classrooms? Secondary questions include (1) if they use it, when do they most use it? (Is it during presenting new information or learning activities or assessment?) (2) Are there any differences between school settings, experience of the teachers? Levels of teaching, age, which would affect the use of constructivist practices in the classrooms?. My research design has its theoretical basis on constructivism.

Teacher educators, student teachers and current teachers can gain valuable insight into their own teaching styles as a result of this research. It could affect teacher education programs about how much far does the pre-service teachers understand the "role of teacher". If teacher education programs can be revisited and changes made, there will be teachers who stay longer in this profession. Teacher educators could also have much to gain from this. If teacher preparation programs were better able to prepare teachers to be attuned to the components of constructivist teaching and how they impact teaching, the transition from an intern to a full time classroom teacher will be very effective and smooth. Finally, teachers themselves will have an opportunity to reflect on their own teaching styles, giving them valuable insight that could make these teachers even better teachers in the future.

Methodology:

This section will describe the sample used for the study, the instruments utilized, and the data analysis procedures etc.

Sample:

The data for this study will be gathered from the science teachers from mostly suburban and rural settings within 150-mile radius of Cincinnati. They will be randomly selected from the list, which will be produced by the education.

Data analysis:

The items for the survey will be analyzed on the basis of the variables that affect the use of constructivist practices (age, gender, experience, school setting, grade levels, lab facilities and the area of certification). Data from the questionnaires will be analyzed using SPSS statistical software for descriptive, frequencies and reliability. After analyzing the items in each variable for each question, ANOVA will be then be conducted to inquire whether there were any significant differences among the variables for the constructivist teaching components. Multiple comparisons will be inquired to find which variable different.

Results and Discussion:

The data is being analyzed. I believe and hope that at least 50% of the teachers will use constructivist practices in the classrooms. The potential implications for this study are that it will examine constructivist instructional practices used in science classrooms and will also be an opportunity for the science teachers to reflect on their own teaching strategies in their classrooms.

References:

1. Beck, J., (1997). Teacher's Beliefs regarding the implementation of constructivism in their classrooms. Unpublished doctoral dissertation, The University of Toledo.
2. Brooks, J G & Brooks, M G. (1998). The case of constructivist classrooms. Alexandria, VA: Association for supervision and curriculum development.
3. Bodner, G, M, (1986, October). Constructivism: A theory of Knowledge. *Journal of chemical education* 63(10), 873-78.
4. Bonnie L. Shapiro (1994). *Constructivism in Education*.
5. Chaille, C., & Britain, L (1991). *The young child as scientist: A constructivist approach to early childhood science education*. New York, N.Y. Harper Collins publishers Inc.
6. Cohen, D.K. (1995, December). What is the system in systemic reform? *Educational Researcher* 24(9). 11-17, 31.
7. Constructivism Update. (1999). Teaching methods used to model a constructivist philosophy.
8. Davis, R. B., Maher, C. A. & Noddings, N. (1990). Constructivist views on the teaching and learning of Mathematics and science. *Journal of Research in Mathematics education*, 4-7-166.
9. Driver, R., Oldham, V. (1986). A constructivist approach to curriculum development in science. *Studies in Science education*, 13 (105-22).
10. Elmore, R.F. (1995, December). Structural reform and educational practice. *Educational Researcher* 24(9). 23-26.
11. Fensham, P J., Gunstone, R. E, & White R. T. (1994). *The content of science. A constructivist approach to its teaching and learning*. Washington, D. C: The falmer press.
12. Glaserfeld, E. V (1996, August September). Footnotes to the "many faces of Constructivism". *Educational Researcher*. 25(6). 19-20.

13. Perkins, D. (1999). The many faces of Constructivism. *Educational leadership*, 57(3), 6-11.
14. Shapiro, B. L (1994). *What children bring to light? A constructivist perspective on children's learning in science*. New York, N.Y: Teachers college press.
15. Saunders, W.L (1992, March). The Constructivist perspectives: Implications and teaching strategies for science and mathematics 92(3). 136-141.
16. Sandra J. Moussiaux. (1997). Constructivist practices: perceptions of teachers and students. *Educational Researcher* (5) 18-24.
17. Tobin, K., Dawson, G. (1992). Constraints to curriculum reform: Teachers and the myths of schooling. *Education Technology, Research and development* 40(1), 81-92.
18. Tolman, M.N., & Hardy, G. R. (1995). *Discovering elementary science methods and problem solving activities*.
19. Von Glaserfeld, e. (1989). Cognition, construction of knowledge and teaching. *Synthesis* 80(1) 121-140.
20. Vygotsky, L. S (1995). *Thought and language*. Cambridge, MA: Institute of chemical education. 639(10), 873-78.
21. Yager, R. E. (1991). The constructivist-learning Model. *The science Teacher*, 51, 52-57.