

Research and Teacher Education: Including Human Factor¹⁾

Lee, Joong Kwoen²⁾

A great amount of research and reform has been done in education, but not much about education has been improved. Much of the research and debate has stemmed from the attempt at making education a science. But, in most of this research, a very important factor has been left out-the individual. Techniques and procedures that are used by scientists on animals in controlled situations in laboratory setting can not be used effectively on humans. Therefore, we must learn from our past, decide what we want from education--from the student and the teacher, match our methods with our goals, and look towards the future, while always keeping in mind-the human factor.

I. Research on Teaching

Sifting through the mountains of educational research--behaviorism, learning theories, process-product studies, direct observation studies, curriculum reforms, modern math era, back to basics movement, paradigm and scientific movements, etc.--what have we really improved about education? There have been many changes, but not much progress. Kuhn(1970) says that it is because of the lack of consensus about past and present accomplishments, and thus the presence of a defining paradigm for education. This belief comes from the attempt to make education a science. From the history and past research attempts, making education into a science has been the goal--from behaviorism to process-product research. But, I think that this attempt to make education a science has been what is wrong with much of the educational research of the past. We have been missing--"the human factor."

It seems quite natural that education would initially turn to the sciences for guidance and methods in research since scientific methods were prevalent and had proved successful in the past--hence, the advent of experimental research, laboratory type settings, and stimulus-response (S-R) psychology. The human element was not included. In fact, the human element was to be controlled so that it could have little or no bearing on the results. However, in education, we are

1) The research project reported in this article is being supported by the Choonchun National University of Education from July 1, 1997.

2) ChoonChun National University of Education (339 Seoksa-dong, Choonchun, Kangwondo 200-703, Korea: FAX: 0361-261-4328; E-mail: joonglee@ns.cnue-e.ac.kr.)

not dealing with animals; we do not teach in laboratories; we usually work with groups of students, not just one; every individual is different, and we can not control or disregard the differences—in fact, we look for them. Each human being can reason and does not respond to stimuli in the same way. But, educational researchers began looking at education from strictly a scientific approach and educational research has evolved (and still is evolving) to a more humanistic approach.

In this paper, I will attempt to present this evolution by starting with past research ideas and come up to the present—from emphasis on learning to emphasis on teaching and then emphasis on the teacher. I will then present my ideas about the way educational research should be conducted, and finally offer suggestions for further research..

II. What is Our Past?

1. Learning

Guthrie(1942) and Gates(1942), coming from a behaviorist point of view, used stimulus-response (S-R) psychology to develop a theory of learning. Guthrie talked mostly about the principle of association—a stimulus pattern that is acting at the time of a response will, if it recurs, tend to produce that response—and he defined learning as essentially a change of signals necessary. Gates focused on connectionism—functional relations between situations and responses. Thorndike(1906) also advocated the importance of connectionism. In 1906, he wrote that "Knowledge should be not a multitude of isolated connections, but well-ordered groups of connections, related to each other in useful ways...". The most important matter in the learning situation was seen as the effect of a response on the organism, whether it produces was seen as the effect of a response on the organism, whether it produces "satisfyingness" or "annoyingness", whether it furthers or retards progress toward the goal. Gagne(1965), in his article "Varieties of Learning", elaborates upon eight types of learning. He also uses the S-R psychology, where he considers the input as the stimulus situation and the output as the response.

Also, much research was done on the amount of drill and repetitive practice necessary. Brownell (1956) wrote that it is important to maintain a balance between skill and meaning. During this time, as Brownell put it, there was too much emphasis on meaning at the exclusion of skills. He stressed that meaning must contribute to computational skill. He proposed the term "meaningful habituation" -habituation being the automatic way in which the response is made, meaningful implying that the behavior have a firm basis in understanding.

Thus, in the 1950's and 1960's, most research dealt with learning and developing theories of learning was enough to investigate education, but this proved to not be the case. The missing element in all of the previously mentioned research was teaching.

2. Teaching

Gage, himself, in 1964, expressed the need for theories of teaching, in his article, "Theories of Teaching". He realized that theories of learning would possibly have greater usefulness when they are transformed to theories of teaching. If we want to influence the learning and the learner, we must influence teaching. The need for theories of teaching also stemmed from the inadequacy of learning theories alone in shaping education. This brought us to the debate about what exactly is teaching and how do we study it. Gage and others sought to counter the arguments by such researchers as Higher(1950), that teaching is an art. In 1963, in his article, "Paradigms for Research on Teaching, Gage defined teaching as "any interpersonal influence aimed at changing the ways in which other persons can and will behave. He then defines research on teaching as "research in which at least one variable consists of a behavior or a characteristic of teachers."

Gage then goes on to present and discuss various paradigms for teaching—a scientific approach to studying teaching. This scientific approach brought about a focus on experimental and observational research method. They viewed direct observation as one of the most revealing techniques in educational research. "Performance criteria", which resulted from process-product research, were criteria referred to specific teacher behavior such as "clarity", "enthusiasm", teacher behavior to student performance. This was the era of teacher and classroom observation, using quantitative methods such as analysis of variance in research to look at teaching, but not at the teacher him or herself.

3. The Teacher

Although the previously mentioned studies began looking at teaching as a viable area for research, each study viewed teaching from a scientific and quantitative standpoint. The art of teaching and the teacher, him or herself, were left out of the research. However, Lortie(1975), sought to begin understanding, teaching from the teacher's point of view, in his book, *Schoolteacher*. He emphasized that teachers need to take a more active role in what goes on in schools. Lortie pointed out that teachers often encounter serious difficulty in assessing their work performance. He also addressed the with four walls and a closed door. Lortie found that teachers perceive boundedness as positive, but this also creates isolation, but teachers must be ready for changes.

As changer occur, teachers will have to become more flexible and adapt to new situations. Marx and Peterson(1981), also investigated this flexibility in their book, *Flexibility in Teaching*. They studied teacher's decision making processed and preactive (what occurs before teaching), and interactive (what occurs in the class with the students) teaching. Marx and Peterson used interviews, audiotaping, and videotaping in their research. Elbaz, in 1983, used the case study method to delve into the practical knowledge of teachers. She makes the assumption that teachers hold a complex, practical set of understandings which they actively use to direct the

work of teaching. Elbaz stated that teachers are very important, but all too often are left out of the research process, and that teachers need to become aware of and articulate their own practical knowledge.

It is my opinion that Elbaz is absolutely correct in her statement that teachers are too often left out of the research process, but if we are to affect change in learning and students, we must study and affect change in teachers also. We must do this by Keeping the human component in research. But, where and how do we begin? We must keep things in perspective and go back to the roots and purpose of educational research. We must know what we want.

III. What Do We Want?

1. From the Student

When thinking about research in education, I believe that it is important to step back and think about what we want out of education. What is our goal? What product do we want? When I think about this, I think of the student. Therefore, when we think about education, we need to begin with the student and what is best for him or her. In general, and idealistically, we want a highly literate-verbally, mathematically, scientifically, technologically-well-rounded problem solver who can function well in and be a contributing member of society. We want this for all (girls, boys, minorities, etc.) individuals, not just white Anglo Saxon males. This has not always been the goal of education, and probably still is not for some, but it is the ideals of today's "democratic" American society. But, how do we obtain, or even come close to obtaining this goal? This question has been with us for a long, long time.

Well, let us look, more specifically, at what we want from each student. It is my opinion that the goals for each student are to (a) make good grades in school, (b) understand the concepts, and (c) like the subject and/or like learning.

By making good grades-better than average, more than a C-in school, I am talking about achievement. This means scores on quizzes, projects, homework, tests, and other kinds of assessments. Of course, included in this is the score on the Scholastic Aptitude Test. Realistically speaking, in today's society, despite the move to deemphasize tests, test scores are still the main means of assessing student progress. Primarily, grades and tests are the determining factors as to whether a child attends post-secondary institutions. In today's increasingly technological society, it is very important that students receive some kind of post-secondary education, hence the importance of good grades.

Although good grades are important, understanding the concepts are equally, or even more important. However, a student's understanding is difficult to ascertain, especially by just quantitative means. Other methods must be used to assess understanding. Included in understanding, I mean that the student should be able, not only to get the correct answers to

problems, but also to make connections within and among subjects, explain the hows and whys of particular procedures, and apply concepts learned to various similar and different kinds of problems. In essence, the student is to become a better thinker and problem solver.

The goal that the student like learning is an elusive one. It is often assumed that if the student does well in a subject and understands the subject, then he or she will like the subject. This is not necessarily the case. It is probably too ambitious a goal to have the student like every subject, hence the goal that the student like learning. Perhaps, if the student enjoys learning, then the student will do better even in subjects that he or she does not like.

2. From the Teacher

It seems reasonable that in researching the three issues presented, we look at not only the student but also the teacher because the teacher plays a major part in the student's learning process. But, the question that I would pose would be, how can teachers better assist students in reaching these three goals. First of all, I believe that teachers should possess certain qualities (five of which were discussed by Hight, 1950, in his book, *The Art of Teaching*). These characteristics are (a) know the subject, (b) like the subject, (c) know the student, (d) like the student, (e) know the pedagogy, and (f) know much else.

The characteristic that the teacher know the subject is fundamental. In fact, the teacher should know more than what he or she is to teach to the student so that the teacher will know where to lead the student. The teacher will also be able to see and be able to convey how the basic concepts fit into the overall scheme of things. The teacher must not only possess the skills necessary for the subject, but also understand the concepts involved in the topics discussed. This understanding will result in the confidence needed to effectively teach the subject. The teacher should also be constantly learning about his or her area so that the material will not seem dull and motionless.

If the teacher likes the subject taught, this will be seen by the student. The teacher will more than likely be enthused about the subject if he or she likes it. This enthusiasm could possibly make the difference in the achievement and attitude of the student. And, if the teacher likes the subject, he or she will want to learn more about the subject and enjoy teaching.

The characteristic that the teacher know the student is perhaps the further addressed later on in this paper. I believe that the teacher should know the student academically, culturally, and personally. Such things as the socioeconomic status, the family background, the motivation level, and the ability and achievement levels should be included. It is important to view each child as an individual, with individual needs, in order to better teach him or her.

Liking students or young people is a prerequisite for any teachers. If a person does not like students, then he or she can not be an effective teacher because both the teacher and the student will know it. The teacher will most likely hate teaching and be disinterested and uncaring toward the students. This will result in resentment on the part of both parties involved.

The characteristic of knowing the pedagogy is usually not included in list of the necessary

traits of an effective teacher, but I consider it important. There are many examples of teachers who know the subject well, but can not teach well. They can not relate to the student and get the information across. There are also many examples, I am sure, of effective teachers, who have not had many formal courses on pedagogy, but I believe that they learned it somehow, whether through experience or fellow teachers. Therefore, I am merely saying that the teacher should know about teaching-different methods, different styles, etc.-regardless of where it is learned. It is probably much better and faster for both the teacher and the student if the teacher learn about pedagogy before teaching the first class.

And, finally, I believe that the teacher should, as Highet(1950) puts it, "know much else." This means that the teacher should be well rounded and enjoy learning, not just information about his or her subject, but information about the students, about teaching, about other subjects, and about the world. This will most likely keep the teacher from becoming stagnant and dull and allow the teacher to relate to the student on many levels.

The characteristics of liking the subject, liking the student, and knowing much else must be within the teacher and must be brought to the classroom, however teacher education should prepare the teacher in areas of knowing the subject, knowing the student, and knowing the pedagogy. How can the teacher be trained in these areas? Firstly, the teacher must be provided with the necessary research and resources, and secondly, teachers must be taught to become researchers themselves.

3. Research-Matching Methods with Goals

With the various and sundry ideas about and methods of educational research, it is very difficult to get a handle on what research should be done. Should I use surveys? Should I use participant observation? Should I use analysis of variance? Should I use interview? In essence, should I use quantitative or qualitative methods? In my opinion, the answer is, it depends. It depends on what you are looking for. In education, there is no one answer. We must teach teachers to look for the best solution for the particular situation, and when you think that you have found that solution and investigated it, look for better solutions.

Do we not want students to become problem solvers? Well, teachers should be problem solvers also. We need not be searching for one best paradigm for teaching in order to make it like a science, as Kuhn(1970) describes. Teaching can not be reduced to just a science. There is an art to teaching. Gage(1972) realized that in his article, "Can Science Contribute to the Art of Teaching." He states that science can contribute to the art of teaching by describing successful teaching behaviors. Gage describes successful teaching behaviors as those which are related to some desirable outcome such as student achievement. He also realizes that there is no single dimension that accounts for effective teaching.

So, now, we are back to choosing a method for research. I contend that it is all relative and that all methods are useful when appropriate. Therefore, we need to think about what our goal is first and then choose the appropriate method or methods to reach this goal. Thinking about

our three goals for students: (a) that they make good grades, (b) that they understand the concepts, and (c) that they like learning, the method or methods depend on our aim. If we are interested in students making good grades (not that this is the only thing that we are interested in, but we want to focus our attention on this area), then we might use a quantitative approach to test certain teaching styles, materials, or activities to determine the effect on student achievement.

An analysis of variance might be done on the data. If we are interested in students' conceptual understanding of material, we might use a qualitative approach to conduct interviews with students to ascertain their thought processes and their ability to form connections with other concepts and problems. If we are interested in how well students like a particular subject questionnaires. If we are interested in all three of the aforementioned areas, we might use a combination of quantitative and qualitative methods. Of course, a combination of methods could be used for any of the situations described above.

Therefore, I think that teachers should be taught, not that there is one best paradigm, not that teaching is just an art or just a science, not that either quantitative or qualitative research is better, not that there should be theories of learning as opposed to theories of teaching, not that the behaviorist approach is worse or better than any other approach, but that the teacher should be taught to determine the appropriate time for each approach. And, in addition to all of this, the human factor should not be left out. It is important to remember that people do not fall exclusively into certain categories and that when we do strictly quantitative research, we must realize that there are real people behind the numbers.

And, even when we do qualitative research, we must realize that the results found were for the particular participant or participants that were investigated and that the findings may not be generalizable to others. In fact, the findings may not describe the person or persons studied in other situations. Research is simply a means for investigation in order to come up with possible explanations, meanings, or just descriptions. These findings may or may not apply to your particular situations, but can serve as examples of what was found in other situations. The approaches chosen should be tested and retested, and the teacher should be a part of this.

4. The Teacher as a Researcher

Elbaz(1983) states that it is possible for teachers to become aware of and articulate their own practical knowledge and this could lead to greater self-understanding and professional growth. It is also her contention, and mine, that the teacher be included in all facets of the educational research process. When new teaching methods, strategies, materials, and studies are being developed, teachers should be included. Teachers should be included, not only in the development, but also in the planning, revising, studying, field testing, implementing, and evaluating of the product. In addition to this, teachers should be researchers of others' teaching and their own.

They must continuously changing, and so should the teacher, and therefore, education. As Green(1971) says, teachers must believe evidentially-beliefs held on the basis of evidentially. In

fact, this should be a defining feature of instruction. Teachers should instruct, not indoctrinate. In indoctrinating, we are concerned simply to lead another person to a correct answer without concern that this person arrive at that answer on the basis of good reasons. If teachers believe evidentially, they will not be happy with the status quo or tradition. Our student population has changed, so the teacher must change to be able to relate to the student and be able to meet the goals of having the student (a) make good grades in school, (b) understand the concepts, and (c) like learning. It is in this area of knowing the student that more research needs to be done, especially with our everchanging student population.

IV. What is Our Future?

1. Knowing the Student-The Need for Further Research

In my opinion, knowing the student is the most important issue in education today, especially in our very diverse society. I stated earlier that we must change the student by changing the teacher because ultimately the teacher is the one who will affect change in the student. But, the teacher must know the student in order to change the student. Perhaps this is why education in America has not been very effective recently for a lot of students. The students have changed, but the teachers-teacher training, teacher styles, and teacher research-has not changed very much.

No longer can we afford to only educate a select group of the American society. With America's advancing industrial and technological society and increasing competition with other countries, we must strive to educate all Americans-women and minorities. Therefore, in our teacher training and research, we need to include such issues as socioeconomic status, culture, motivation and self-esteem, and family factors, as well as the typical issues of ability and achievement, when considering students and research on students and teaching. There is little research on the effects of low socioeconomic status, the culture, and the family background on the achievement of the student.

These issues should be of extreme importance in teacher education programs to better prepare teachers in dealing with different kinds of students. Researchers, including teachers themselves, should be investigating these factors in their research. For, I believe that in order to make progress in and improve education, we must learn more about the factor that we are trying to affect-the student. And, we must be sure to include not only include stimuli, responses, paradigms, tests, charts, graphs, numbers, statistics, and generalizations. We must also include the thoughts of the students, the words of the students, the problems of the students, the background of the students, the concerns of the students, the differences of the students. We must include in our research-the human factor.

References

- Brownell, W. A. (1956). Meaning and skill-maintaining the balance. In Crosswhite, Higgins, Osborne, & Shumway (Eds.), *Teaching Mathematics: Psychological Foundations* (pp. 186-194).
- Elbaz, F. (1983). *Teacher Thinking: A Study of Practical Knowledge*. New York: Longman.
- Gage, N. L. (1963). Paradigms for research on teaching. In Gage (Ed.), *Handbook of Research on Teaching* (pp. 94-141).
- Gage, N. L. (1964). Theories of teaching. In *Theories of Teaching and Instruction: 63rd NSSE Yearbook* (pp. 268-285).
- Gage, N. L. (1972). Can science contribute to the art of teaching? In *Teacher Effectiveness and Teacher Education* (pp. 27-39).
- Gagne, R. M. (1965). Varieties of learning. In *The Conditions of Learning* (pp. 33-62). New York: Holt, Rhinehart, Winston.
- Gates, A. I. (1942). Connectionism: Present concepts and interpretations. In *1942 Yearbook* (pp. 141-164). The National Society for the Study of Education.
- Green, T. (1971). *The Activities of Teaching* (pp. 41-63). New York: McGraw-Hill.
- Guthrie, E. R. (1942). Conditioning: A theory of learning in terms of stimulus, response, and association. In *1942 Yearbook* (pp. 17-60). The National Society for the Study of Education.
- Highet, G. (1950). *The Art of Teaching* (pp. 12-57).
- Kuhn, T. S. (1970). *The Structure of Scientific Revolutions*. Chicago: University of Chicago Press.
- Lortie, D. (1975). *School Teacher*. Chicago: The University of Chicago Press.
- Marx, R. & Peterson, P. (1981). The nature of teacher decision making. In Bruce, Brown, & Peck (Eds.), *Flexibility in Teaching* (pp. 236-255). Longman.
- Medley, D. M., & Mitzel, H. E. (1963). Measuring classroom behavior by systematic observation. In Gage (Ed.), *Handbook of Research on Teaching* (pp. 247-328).
- Rosenshine, B., & Furst, N. (1971). Research in teacher performance criteria. In Smith (Ed.), *Research I Teacher Education* (pp. 37-72).
- Thorndike, E. L. (1906). *Principles of Teaching* (pp. 133-135).

<요약>

인간적 요소를 고려한 교육 연구와 교사 교육

이 중 권³⁾

교육 분야에 상당히 많은 연구가 있었고, 교육 개혁 또한 수 차례에 걸쳐 이루어졌다. 그러나 실질적으로 교육에서 진정으로 도움이 될 만한 발전을 이루지는 못했다고 말할 수 있다. 많은 교육 연구와 교육 논쟁들은 교육을 하나의 과학으로 만들려는 시도를 저지해 왔다. 그러나 대부분의 연구물들은 교육에 있어서 아주 중요한 요소인 인간 개인의 특질적 성향에 대한 요소를 빠트리고 연구를 전개해 온 것이다. 과학자들이 실험실이나 컨트롤된 환경에서 동물들에 사용했던 연구 기술이나 연구 과정 등은 교육 환경에 처한 인간에게는 효과적으로 적용될 수 없는 것이다. 따라서, 우리는 우리가 해 온 과거로부터 잘못된 것을 인지하고 교육에 있어서는 늘상 인간이라는 요소를 염두에 두고 교육이 진정으로 원하는 것이 무엇인지 - 학생 그리고 교사가 원하는 것이 무엇인지를 - 결정해서 우리의 교육 목표와 우리의 방법을 일치시키고, 미래를 바라볼 수 있어야 한다.

3) 춘천 교육 대학교 ([200-703] 강원도 춘천시 석사동 339)