
The Influence of Teacher Experience on the Elementary Classroom System: An Observational Study

Evelyn A. O'Connor
QUEENS COLLEGE OF THE CITY OF NEW YORK

Marion C. Fish
QUEENS COLLEGE OF THE CITY OF NEW YORK

Anastasia E. Yasik
PACE UNIVERSITY

ABSTRACT

This study used a systems perspective to determine whether differences exist between classrooms of expert (n=35) and novice (n=35) teachers on the cohesion, communication, and flexibility dimensions of the *Classroom Systems Observation Scale (CSOS)*. A 50-minute observation using the *CSOS* was conducted in elementary school classrooms in New York State. The study found classrooms of expert teachers had statistically higher levels of classroom communication and flexibility than classrooms of novice teachers, while there was no difference for classroom cohesion. Results indicate that expert teachers' classrooms were significantly more flexible than classrooms of novice teachers; however, no differences were found in the number of classrooms that fell within the balanced range. Implications for classroom environment and student learning are considered.

INTRODUCTION

A major goal of research in education is to examine variables that contribute to the improvement of students' learning and achievement in the classroom. Students spend up to six hours a day in a school setting. Elementary students in particular spend the majority of this time in one classroom interacting with each other and the teacher. It is important that researchers understand the factors that influence students' learning in this setting.

Research on learning environments has examined the influence of numerous classroom variables on affective and cognitive student outcomes. Wang, Haertel, and Walberg (1993) reviewed this literature and reported that classroom management, as well as academic and social interactions between students and teachers, had a direct influence on students' learning. "Positive teacher and student social interaction contribute to students' sense of self-esteem and

foster a sense of membership in the classroom and school" (Wang et al., 1993, p. 277). Classroom environments have been found to be predictors of achievement and attitudes (Walberg, Fraser, & Welch, 1986). A number of teacher characteristics influence classroom interactions including experience (Leinhardt, 1989; Livingston & Borko, 1989), and teacher efficacy (Ashton & Webb, 1986).

Other studies on learning environments investigated student perceptions of the classroom setting. In a review of literature on learning environments, Fraser (1986) reported a relationship between students' perceptions of the classroom setting and their attitudes towards learning and academic performance. Similarly, Valeski and Stipek (2001) found that kindergartners' and first-graders' feelings about school were related to their academic performance. Studies on the classroom environment have shown that relationships exist between students' perceptions of the learning environment and the sense of responsibility to perform well in class (Wang & Walberg, 1986), their attitudes toward and knowledge of the subject being taught (McRobbie & Fraser, 1993), scores in English and math (Byrne, Hattie, & Fraser, 1986), and their general feelings of satisfaction with school (Baker, 1999). Overall, these studies showed that the classroom environment influences the student socially, emotionally, and academically.

Many aspects of the classroom system can affect students' performance. One characteristic that has been shown to influence the classroom system is teachers' experience.

"Everything the teacher does, as well as the manner in which he does it, incites the child to respond in some way or other, and each response tends to set the child's attitude in some way or other" (Dewey, 1960, p. 59).

Research has shown that teachers' experience influences the processes of lesson presentation (Cleary & Groer, 1994;

Livingston & Borko, 1989; Westerman, 1991), disciplining classes (Sabers, Cushing, & Berliner, 1991), and dealing with change (Cleary & Groer, 1994, Livingston & Borko, 1989; Westerman, 1991). Teacher experience is often studied through the constructs of expert and novice, where expert and novice are determined by the level of "teacher knowledge as an integrated system of internalized information acquired about pupils, content and pedagogy" (Artzt & Armour-Thomas, 1997, p. 10).

Expert vs. Novice Teachers

Researchers have examined the differences that exist between expert and novices in various areas. A review of the literature on experts and novices by Chi, Glaser, and Farr (1988) found that within their particular domain, experts have superior self-monitoring skills, examine problems qualitatively, solve problems quickly and fairly accurately, and process large meaningful patterns within their subject areas. In other studies, experts have consistently displayed a more elaborate knowledge base and perceived problems on a deeper, more complex level than novices (Gallagher, 1994; Weinert, Schrader, & Helmke, 1990). Furthermore, research has shown that experts are more capable than novices at comprehending and describing classroom phenomena in depth (Carter, Cushing, Sabers, Stein, & Berliner, 1988; Peterson & Comeaux, 1987; Sabers et al., 1991). These studies report that experts used students' questions and responses to guide discussion (Cleary & Groer, 1994; Livingston & Borko, 1989; Westerman, 1991), were more flexible and able to connect students' questions to the lesson (Leinhardt, 1989; Livingston & Borko, 1989; Westerman, 1991), used more interactive decisions (Cleary & Groer, 1994), and were better able to interpret students' behavior (Carter et al., 1988; Sabers et al., 1991). Finally, experts were able to offer possible solutions for problems that they observed in the classroom (Sabers et al., 1991). In contrast, novices had difficulty presenting their lessons in a connected and meaningful way (Leinhardt, 1989), were more concerned about their teaching effectiveness than student understanding (Livingston & Borko, 1989; Westerman, 1991), and neither picked up on students' cues nor deviated from their lesson plans (Cleary & Groer, 1994).

Results from these studies show that expert and novice teachers react differently to their students and differ in the way they present lessons. "Teaching is a complex act requiring the moment-by-moment adjustment of plans to fit continually changing and uncertain conditions" (Lampert & Clark, 1990, p. 21). In order to continually adjust, teachers must be aware of what is occurring in the classroom and be willing to make changes accordingly. Because expert teachers are more sensitive than novices to the performance cues from students (Borko & Shavelson, 1990), they are able to adapt the lesson for greater student learning. Since novice teachers spend more time focusing on lesson content and resolving discipline issues, they spend less time reacting to and altering their plans

to meet their students' learning needs (Cleary & Groer, 1994; Livingston & Borko, 1989; Westerman, 1991). This suggests that expert teachers help create an environment more conducive to learning.

While expert and novice teachers' behaviors in the classroom have been examined, little research exists on systemic differences in classrooms of expert and novice teachers. Researchers commonly use case studies, observations, and instruments measuring teacher behavior and student and teacher perceptions to assess classroom learning environments (Fraser, 1991).

For example, the *Learning Environment Inventory* (Fraser, Anderson, & Walberg, 1982), the *Classroom Environment Scale* (Moos & Trickett, 1987), the *Instructional Environment Scale* (Ysseldyke & Christenson, 1987), and the *My Class Inventory* (Fisher & Fraser, 1981) have all been used to examine associations between students' cognitive and affective learning outcomes and the classroom environment (Fraser, 1998). These instruments focus on student and teacher perceptions. The *Classroom Systems Observation Scale* (CSOS; Fish & Dane, 1995) is an instrument that evaluates systemic dimensions of the classroom environment using an outside, objective observer. The CSOS is used to assess the functioning of the classroom from a systems perspective. (Fish & Dane, 1995.)

A Systems Approach

A systems perspective posits that all systems (e.g., solar, family, school, classroom) function in a similar way: all parts interact with each other and each part affects all other parts, as opposed to looking at the component parts as separate and unrelated (Nichols & Everett, 1986; Nichols & Schwartz, 2001). In systems theory we can examine "the dynamics of interaction, interdependence, and patterns that connect and integrate the functions and components of a social system" (Banathy, 1996, p. 157). Systems theory is an approach that goes beyond looking at the interaction between two people (e.g., parent and child or teacher and student); and instead investigates the interaction of all members and how the various relationships influence that system.

Systems theory has been frequently used when working with families. The constructs applicable to family systems may also be applied to the classroom system (Conoley, 1987; Lightfoot, 1978). Conoley (1987) found that schools and families are functionally, structurally, and culturally similar.

Circular causality and homeostasis are concepts that are essential parts of the framework of systems theory. Circular causality, which refers to recurring interaction patterns or "repeating cycles" (Nichols & Schwartz, 2001) among individuals, can be seen as constantly operating in the classroom environment. For example, teachers' beliefs influence their behaviors, which in turn influences students' beliefs and behaviors toward themselves and others, which then influences teachers' beliefs and actions. Circular causality is also observed when a teacher's communication to students

influences how the students behave in the classroom, which in turn affects how the teacher reacts to the students.

Homeostasis refers to a system's ability to regulate itself so it maintains balance and consistency when outside influences try to exert change (Nichols & Schwartz, 2001). Due to influences from external sources (e.g., school environment) the members of the classroom are always trying to maintain homeostasis by regulating their behavior. For example, when an assembly disrupts the daily class schedule, the teacher may strive to maintain regularity in the classroom by following classroom routines and rules as much as possible.

The classroom is a complex system composed of the teacher, the students, and the transactions among them. The classroom, like the family, has a certain structure with established transactional patterns that consist of overt and covert rules and a hierarchy that controls interactions (Minuchin, 1974; Nichols & Schwartz, 2001). In the classroom the teacher is at the top of the hierarchy. For example, during the first week of school, the teacher may state the rules of the classroom and post them on a wall (overt rule). In addition, there are also unspoken (covert) rules, such as turn taking in group discussions or allowing students to leave their seats on certain occasions without asking permission (e.g., sharpening pencils or throwing away trash).

The classroom system has students and teacher(s) who belong to a class with its own set of rules, routines, and space (Fish & Jain, 1988). Here students function as part of the group and identify themselves as belonging to that particular class. For instance, students from the same class will often play together during recess, possibly even competing together as a team against other classes. Within the classroom, the child is a separate individual, with special talents, abilities, and a unique and distinct personality. From a classroom systems perspective, one wants to promote both a student's sense of belonging and his or her individuality.

The CSOS (Fish & Dane, 1995) was developed to assess classroom functioning using a systems perspective. It is theoretically derived with acceptable reliability and validity. Consistent with systems thinking, it shifts the focus of observation from the individual child to the classroom. This is an observational instrument that both evaluates the interactional patterns among all members of the classroom (e.g., students, teacher(s), aides) on three dimensions: flexibility, cohesion, and communication; and measures systems functioning (Fish & Dane, 2000). The CSOS is based on the *Circumplex Model of Marital and Family Systems* (Olson, Russell, & Sprenkle, 1989) which consists of the same three dimensions. Flexibility is defined as the degree to which the teacher and students adapt to the changing circumstances that occur in the classroom. Cohesion is the sense of belonging

Table 1

Demographic Variables of Novice and Expert Teachers

Grade	Novice Teachers			Expert Teachers		
	Public	Private	Total	Public	Private	Total
K	4	2	6	4	1	5
K/1	0	0	0	0	1	1
1	7	2	9	6	4	10
2	2	3	5	1	3	4
3	1	2	3	3	4	7
4	2	2	4	2	1	3
5	1	4	5	0	3	3
6	0	3	3	1	1	2
Total	17	18	35	17	18	35

and support among the members of the classroom. Communication is measured by the level of expression of thoughts, feelings, and ideas by the members of the classroom.

Purpose of the Study

The purpose of this study was to investigate whether a teacher's level of experience is associated with flexibility, cohesion, and communication in the elementary classroom system. The information gained from this study helps teachers and other school personnel to identify differences in novice and expert teachers and to design appropriate interventions to establish balance and improve learning in the classroom system, benefiting the students on a cognitive, social, and emotional level.

This study sought to answer the following questions:

1. Do the classrooms of expert and novice teachers differ in communication?
2. Do the classrooms of expert and novice teachers differ in flexibility?
3. Do the classrooms of expert and novice teachers differ in cohesion?

Based on the findings of previous classroom research it was hypothesized that the only difference between the two groups on the CSOS would be on flexibility, that is, expert teachers would be associated with more flexible classrooms than the novice teachers.

Table 2*Sample Items from the Classroom Systems Observation Scale*

	Classroom Cohesion		Classroom Flexibility		Classroom Communication
C-1	Teacher encourages class to work as a group.	F-4	Teacher is responsive to students' need for orientation.	CO-3	Students Use "I" statements to express feelings and opinions.
C-16	Students assist other students with academic work.	F-6	Teacher considers circumstances in enforcing consequences.	CO-9	Teacher speaks about friends and families with students.
C-17	Students share classroom space.	F-9	Decisions made through teacher-student conference.	CO-10	Teacher's verbal messages are clear and consistent.

METHOD**Participants**

The sample consisted of classrooms of 35 expert and 35 novice elementary school teachers from 17 schools in New York State. The schools included nine private and eight public schools in an urban region, and one private school in a suburban region. Teachers who had less than one full year of teaching experience were assigned to the novice group. Teachers who, per principal nomination, displayed exceptional teaching ability, had five years or more teaching experience, and had one or more years experience at their present grade level were considered expert teachers. The average career length for expert teachers was 18 years, with a range from 5 to 43 years. Table 1 presents distribution information for the novice and expert teachers.

Measure

Within the *CSOS* (Fish & Dane, 1995), there are four levels of flexibility: rigid (very low), structured or flexible (moderate), and chaotic (very high). Cohesion also has four levels: disengaged (very low), separated or connected (moderate), and enmeshed (very high). Both the flexibility and cohesion dimensions of the scale are curvilinear, where the outer two levels represent unbalanced functioning, and the two mid-levels represent balanced functioning. The communication dimension is linear, ranging from low to high, and is viewed as facilitative of the other two dimensions.

The interrater reliability for the three dimensions are: cohesion (.83), flexibility (.89), and communication (.61) (Ishofsky, Fish, & Sullivan, 1995). In addition, the test-retest reliability for the 3 dimensions - cohesion (.77), flexibility (.79), and communication (.45) - are moderate (Tener & Fish, 1998). The *CSOS* has also been shown to have adequate construct validity (Berkson, Berger, Fish, & Dane, 1995). The *CSOS* consists of 47 items, a 20-item Classroom

Cohesion dimension, a 13-item Classroom Flexibility dimension, and a 14-item Classroom Communication dimension (Fish & Dane, 2000) (See Table 2). Each dimension of the *CSOS* is comprised of items that measure specific dimensions related to system theory. The cohesion dimension includes items that measure emotional bonding, supportiveness, and boundaries. The flexibility dimension contains items that assess leadership, discipline, negotiation, roles, and rules. The communication dimension contains items that evaluate listener's skills, speaker's skills, self-disclosure, clarity, continuity/tracking, and respect and regard.

The scale items reflect the interactional behaviors of the teacher and students in the classroom. During the 50-minute observation the observer keeps a frequency tally of the behaviors described in each item and records it on the protocol. The number of tally marks per item is then summed. Based on the number of tally marks for each individual item a score ranging from 1 to 4 is assigned (1= no tallies, 2 = 1 or 2 tallies, 3 = 3 or 4 tallies, and 4 = more than 4 tallies) for the cohesion and flexibility dimensions. The communication dimension is assigned an individual item score of 1 to 6. This is a linear score, with a score of 1 reflecting low communication and a score of 6 reflecting high communication. Within each dimension the mean item score is calculated to determine the rating for that dimension. For a more detailed description of the scoring procedures see the *CSOS* manual (Fish & Dane, 1995).

Procedure

Principals identified novice and expert teachers in their schools using the criteria described above. After the principals nominated the teachers, the identified teachers were informed about the study and their consent to be observed was obtained. Using the *CSOS*, the researcher conducted one 50-minute classroom observation for each teacher. In all instances, the researcher sat in the back of the classroom to observe and record results. Following each observation, the observer

scored the protocols. Global ratings for each of the three dimensions were then calculated. Of the 70 observations that were conducted, 66 were conducted in the morning and 4 were conducted in the afternoon. The observations took place during a variety of lessons (61 language arts/literacy, 4 science, 4 math and 1 social studies).

The data for this study consist of 20 observations conducted for a pilot study and an additional 50 observations. Two researchers, one graduate student and the primary author, collected the data for the pilot study of 10 expert and 10 novice teachers. An expert on the CSOS, using videotaped classroom situations, trained both of these researchers. They conducted practice observations as an additional part of the training process. The two researchers, with help from an expert, obtained an interrater reliability score of .80 prior to the collection of the data. The first author and a graduate student obtained the interrater reliabilities for the three dimensions for 20% of the subsequent 50 observations in this study. Cohesion (.80) was significant at the $p < .01$ level. Flexibility (.63) and communication (.68) were significant at the $p < .05$ level.

RESULTS

The researchers conducted a series of analyses to examine differences between classrooms of expert and novice teachers on the CSOS communication, cohesion, and flexibility dimensions (see Table 3). The first analysis examined the communication scores of classrooms of expert and novice teachers. A t-test revealed that expert teachers' classrooms had a significantly higher mean CSOS communication score than that of novice teachers' classrooms, $t(68) = -2.014$, $p < .05$. A second set of analyses compared the mean CSOS flexibility and cohesion ratings of classrooms of expert versus novice teachers. These t-tests revealed that expert teachers' classrooms scored significantly higher on the flexibility dimension of the CSOS, $t(68) = -3.497$, $p < .01$, but there was no significant difference on the cohesion dimension of the CSOS, $t(68) = -1.25$, $p = .22$.

Given the curvilinear nature of the CSOS, additional analyses were conducted to examine differences between classrooms of expert and novice teachers with regard to level of cohesion and flexibility. Table 4 presents the percent of classrooms of expert and novice teachers within the four different levels of flexibility and cohesion. Given the limited number of cases per cell, the researchers collapsed the data to reflect balanced (2 middle levels) and unbalanced levels (2 outer levels) of flexibility and cohesion. Two separate chi-square tests indicated non-significant differences between classrooms of expert and novice teachers with regard to flexibility, $X^2(N = 70) = 2.06$, $p = .15$, and cohesion, $X^2(N = 70) = 1.01$, $p = .31$. While 5.7% and 2.9% of classrooms of novice teachers were rated as having unbalanced levels of flexibility and cohesion, respectively, 0% of classrooms of expert teachers demonstrated unbalanced flexibility and cohesion.

Table 3

Means and Standard Deviation by Teacher Experience Level

CSOS Dimensions	Novice Teachers		Expert Teachers	
	Mean	SD	Mean	SD
Communication	3.50	.49	3.74	.52
Flexibility	1.89	.27	2.09	.22
Cohesion	2.18	.35	2.27	.27

DISCUSSION

This study examined classrooms using a systems perspective. The present study investigated whether a teacher's level of experience has an influence on the classroom system. It was predicted that classroom communication would not differ based on teachers' level of experience. This hypothesis was not supported. Classrooms of expert teachers were shown to have significantly higher communication. The communication domain of the CSOS reflects "open discussion related to the topic, attentive listening, clarity of message, and continuity of material presented" in the classroom (Fish & Dane, 1995, p. 2). This finding is supported by prior research on expert and novice teachers. Because experts monitor student understanding of the information presented in lessons more closely than novices (Livingston & Borko, 1989), and because they use students' questions and responses to guide discussion (Cleary & Groer, 1994), they may encourage more open discussions in the classroom. In relation to clarity and continuity of the lesson, experts tend to connect past lessons with current lessons (Leinhardt, 1989; Westerman, 1991), while novices have difficulty presenting their lessons in a connected and meaningful way (Leinhardt, 1989). When questioned, novices are less likely to remain on topic and connect the students' questions to previous or current lessons (Livingston & Borko, 1989; Westerman, 1991). One of the most effective and efficient ways of learning new material is to link it to what students' previously experienced or learned. Since expert teachers clearly communicate their ideas and teach new concepts by making links to students' prior learning, it appears that these teachers would have a more positive effect on students' learning.

Results indicate that expert teachers' classrooms were significantly more flexible than classrooms of novice teachers, however, no differences were found in the number of classrooms that fell within the balanced range. Although previous research has demonstrated that experienced teachers are more flexible in the classroom than novice teachers (Leinhardt, 1989; Livingston & Borko, 1989; Westerman,

Table 4*Flexibility and Cohesion by Teacher Experience Level*

CSOS Flexibility	Novice	Expert	Total
Rigid	5.7%	0.0%	2.9%
Structured	94.3%	91.4%	92.9%
Flexible	0.0%	8.6%	4.3%
Chaotic	0.0%	0.0%	0.0%

CSOS Cohesion	Novice	Expert	Total
Disengaged	2.9%	0.0%	1.4%
Seperated	82.9%	77.1%	80.0%
Connected	14.3%	22.9%	18.6%
Enmeshed	0.0%	0.0%	0.0%

1991), the classrooms of both groups of teachers in this study were flexible. It is worth noting the trend that indicated all expert teachers had a balanced level of flexibility when compared to the novice teachers, who had a small percentage (5.7%) of teachers who fell in the rigid, unbalanced range of flexibility. Significant results may have occurred if the sample size was larger.

On the cohesion dimension of the CSOS, the study found no significant difference between expert and novice teachers' classrooms. In accordance with our initial hypothesis, teachers' experience did not influence classroom members' sense of belonging.

Limitations

The reliance upon principal nominations presented one limitation in the definition of an expert teacher. When asked to nominate expert teachers, some principals stated they would consider most of their teachers experts in the field of teaching. Since the researchers also considered criteria such as years of teaching and years at the current grade level, the term "experienced" might apply more accurately than "expert" in future studies.

The use of only one fifty-minute observation of each teacher presents the study's second limitation. While additional observations might strengthen the findings, both the test-retest and interrater reliability of the CSOS were based on single observations of classrooms and are considered adequate. Finally, the majority of the observations in this study

occurred in an urban setting. Thus, the results may not extend to rural or suburban areas.

As a next step, future research could examine if a relationship exists between the classroom system and student achievement. If communication and flexibility differ in classrooms of expert and novice teachers, this may have implications for classroom performance. Previous research has shown a relationship between some classroom environment factors (e.g., cohesiveness, order and organization, and rule clarity), students' achievement (Byrne et al., 1986), and effective schools (Waxman, Huang, Anderson, & Weinstein, 1997). Researchers might also investigate whether the three dimensions of the CSOS differ when observations take place during different subjects (e.g., math, science, and reading) or at different grade levels (e.g., primary vs. middle grades).

This study has demonstrated that novice teachers sustain classroom systems with poorer communication than those of more experienced teachers. Because teacher experience is associated with level of communication in the classroom system, educators have various avenues for improving this aspect of the classroom system. Increased hours spent in the school as a student teacher, as well as college lessons aimed at helping student teachers reflect and think about their teaching (Livingston & Borko, 1989) may prove effective in improving communication in the classroom. Mentors could also use the CSOS to help identify classroom dimensions that fall outside of the balanced range, and then, design interventions that would move the classroom back to the balanced range. With this information the mentor and the novice teacher could work together to develop these appropriate interventions. A classroom that has a higher degree of communication will benefit both the teacher and the students.

In today's schools a child experiencing problems in a class will be referred for evaluation to determine the causes of the difficulty. The more traditional assessment based on a medical model assumes that the child "owns" the problem, that the source is within the child. Using a systems' approach, a child's problem is seen as occurring in a larger context and is related to continuous interactions between the child and others within the classroom environment (Lebow, 2003; Souter, 2001). "Children's symptoms are viewed as adaptive responses to the social system in which he/she is embedded" (Carlson, 1987, p. 458). The child both influences the system and is influenced by the system (McGarry, 2002). To change the classroom system or the functioning of an individual person in that system, it is necessary to look closely at how the system operates. "Because a system learns as a whole, individual components of a system are most often not aware of what is learned at the systems level or how it affects their behavior within the system" (McGarry, 2002, p. 502). To intervene include modifications of the classroom environment and help make changes in the attitude or behavior of the teacher, rather than solely focus on the individual (Souter, 2001).

In the era of "No Child Left Behind," it is important to

note that the daily interactions within the classroom system have the greatest potential to influence a child's academic performance. Research has shown that students in effective schools reportedly feel a closer cohesive bond with their fellow students, have more supportive teachers, and maintain better classroom order and organization than students in ineffective schools (Waxman, Huang, Anderson, & Weinstein, 1997). Students in effective schools have significantly higher teacher-student interactions than those in ineffective schools (Waxman & Huang, 1997; Waxman et al., 1997). Since activities and events in the classroom affect student outcomes, having tools that will support cohesiveness, flexibility, and communication in the classroom will benefit students. A systems approach to classroom analysis allows examination of "the way the functioning of parts or components will affect the performance of the whole. Such analysis becomes the

basis upon which synthesis proceeds in order to build a system in which the functioning and interaction of components will be designed in a manner to ensure the best possible performance" (Banathy, 1967, p. 282). One can identify possible etiological factors in an ineffectively functioning classroom and thus derive solutions to adjust patterns of behavior. Sinclair and Fraser (2002) found that providing support to teachers and information about students' perceptions was successful in improving the classroom environment. Due to the interdependent interactive nature of the system, an adjustment in one or more areas of the system will impact others, thus making a change in the environment. In conclusion, measuring interaction patterns can be used to examine the classroom system, to make appropriate alterations in teaching practice, and to help design functional systems.

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