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ABSTRACT

This paper presents the results of a two-part study that investigated classroom seating design preferences among elementary classroom teachers. In part one, the researchers mapped and classified seating arrangements that were in actual use across 294 regular classrooms (grades K-5) in 21 public elementary schools. Subsequently, the researchers asked 138 elementary regular classroom teachers (grades K-5) to describe, in a survey, the occasions and their rationales for the seating designs they typically employed. In contrast to outcomes from research conducted a decade ago, and irrespective of grade level and school socioeconomic status, results showed that small group cluster designs were now used pervasively (i.e., in 76 percent of observed classrooms, and by 94 percent of surveyed respondents), apparently because many contemporary teachers believe that this type of seating arrangement contributes directly to students' educational growth through the effects of socially facilitated learning. The study did not specifically address the validity of this belief, but it did yield a number of relevant, testable propositions. (Author/SM)

A Survey Study of Elementary Classroom Seating Designs [1]

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Abstract

This poster session presents the results of a two-part study that investigated classroom seating design preferences among elementary classroom teachers. In part one, we mapped and classified seating arrangements that were in actual use across 294 regular classrooms (grades K/1-5) in 21 public elementary schools. Subsequently, we asked 138 elementary regular classroom teachers (grades K-5) to describe, in a survey, the occasions and their rationales for the seating designs they typically employ. In contrast to our outcomes from a decade ago, and irrespective of grade level and school SES, we found that small group "cluster" designs were now used pervasively (i.e., in 76% of observed classrooms, and by 94% of surveyed respondents), apparently because many contemporary teachers believe that this type of seating arrangement contributes directly to students' educational growth through the effects of socially facilitated learning. The study did not specifically address the validity of this belief; but it did yield a number of relevant, testable propositions.

[1]Poster presentation, 2001 Annual Convention of the National Association of School Psychologists; Washington, D.C.

Rationale

In their role as learning and behavior specialists, school psychologists often make diagnostic-prescriptive observations of students in their classrooms (e.g., Reschley & Wilson, 1995); and in doing so, they may consider the potential relevance of seating design (e.g., Weinstein, 1992). But does the physical arrangement of classroom seating significantly affect students' long range educational development? Intuitively it would seem that it must (e.g., Zifferblatt, 1972). However, while a few small scale studies have examined the relationship between seating design and certain, implicitly pertinent classroom behaviors (like student time-on-task), outcomes often have been contradictory (c.f., e.g., Bonus & Riordan, 1999, with Wheldall & Lam, 1987), and there is no definitive answer to the broader question.

If research is to effectively address this issue, then a necessary first step is to determine precisely which seating designs are actually used by today's teachers (given a wide universe of "possibilities"). With just this objective in mind, Knauss (1989) and two of this study's co-authors completed a now decade-old survey investigation wherein the observed seating arrangements for 197 kindergarten through fifth grade classrooms, in 19 elementary schools, were topographically mapped and subsequently classified as "row" (44%), "cluster" (35%), "perimeter" (4%), "perimeter-row" (11%), "perimeter-cluster" (1%), "row-cluster" (3%), and "non-conforming" (2%) arrangements.

Could these data be representative of today's seating design practices? In reflecting on this possibility, and taking into consideration the recent, rapid growth in popularity of "cooperative learning" instructional techniques (e.g., Cohen, 1994), we judged the appropriate answer to be "not necessarily". Therefore, we designed the present, two-part study to be a replication and extension of the Knauss (1989) investigation; but now addressing two broad questions: 1) What kinds of seating arrangements do contemporary elementary classroom teachers employ?, and 2) What are their primary reasons for doing so?

Method, Part I

To partially answer our first question, we adopted and modified the Knauss (1989) mapping procedure, which involves the production of hand-drawn topographic representations of classroom desk and chair arrangements (see example in Appendix A). The reliability of this procedure was evaluated in two ways; that is, through desk count agreements for mappings of the same 12 classrooms, made independently by three of this study's co-authors (yielding an inter-rater agreement percentage of 99.60%), and through a "holistic" map-matching procedure carried out, with those same 36 randomized maps, by an independent colleague who matched them with 100% accuracy. In April and May of 2000, we drew the in-use seating arrangements for 294 regular classrooms (grades K/1-5) in 21 Cedar Rapids, Iowa public elementary schools. Then, working from the Knauss (1989) classification system, we devised objective criteria to define her original six seating arrangement categories (Appendix B), which we then used to complete the classification of our 294 maps (via a three-person collaborative rating procedure that yielded a 92% inter-rater agreement percentage).

Results, Part I

Table 1 summarizes the seating design category frequencies across 11 grade levels, and presents the category totals and percentages for this study and for Knauss (1989). To evaluate the possible relationship between current category frequencies (row, cluster, perimeter, and combinations) and grade level (K-1/2, 2-3/4, 4-5), an R x C Chi Square analysis was computed, and the resulting statistic value was non-significant, $X^2(6) = 12.00, p > .05$. An R x C Chi Square analysis also was computed for category frequencies (rows, clusters, perimeters, and combinations) plotted against school SES levels (high, medium, and low, via free and reduced lunch percentages); and this, too, yielded a non-significant outcome, $X^2(6) = 2.77, p > .80$. Finally, a simple Chi Square analysis was performed to assess the degree to which the present seating category percentages (for all six categories) were compatible with those reported by Knauss (1989). Here, the analysis did yield a significant outcome, $X^2(4) = 222.54, p < .0001$, primarily reflecting a contemporary, major reduction in row design use (from a previous 44% to 14%), and a substantial increase in the employment of cluster designs (from a previous 35% to 76%).

Method, Part II

To extend our inquiry for question one, and to address our second question, we designed the three-item survey instrument shown in Appendix C. This instrument, as originally presented via large-group format, in four schools, to 47 elementary regular classroom teachers in May of 2000 (grades K/1-5), included only the first item. However, in January of 2001 we added items 2 and 3, and administered the survey, in six more schools, to an additional 91 elementary regular classroom teachers (grades K-5). Accordingly, 138 teacher respondents answered item 1, while 91 answered items 2 and 3 (see Table 2).

Results, Part II

Among our 138 respondents who answered item 1, 77 (56%) indicated that they use only one seating design type over the course of a typical school year, while 61 (44%) said that they routinely employ more than one type of arrangement. Overall, this outcome does not differ from chance, $X^2(1) = 1.44, p > .20$. However, the proportion of single versus multiple arrangement users varied significantly for primary as opposed to intermediate grade teachers, $X^2(1) = 7.55, p < .01$, wherein 55% of grade K-2 teachers said they use only one arrangement, but 69% of grade 3-5 teachers indicated a use of multiple arrangements. Additionally, among single arrangement users, 91% (70 of 77) said they employ cluster designs. But for multiple arrangement users, row-type and cluster-type designs were employed, in rotation, with similarly high frequency (97% and 98%, respectively, versus 34% for perimeter designs, 10% for row-perimeter combinations, and 5% for cluster-perimeter combinations).

For survey item 2, 60% of the respondents [54 of 91, $X^2(1) = 4.06$, $p < .05$] said they would deliberately avoid using at least one type of seating arrangement. Among these teachers, 63% (34 of 54) indicated that the to-be-avoided arrangement would be row-like, whereas only 7% (4 of 54) said they would avoid cluster-like arrangements.

The principal issue addressed by survey item 3 was whether any seating arrangement, per se, operates to enhance students' learning of individual, basic academic skills. In fact, a majority of respondents answered 'yes' [i.e., 54 of 91, $X^2(1) = 4.06, p < .05$], among whom 69% (37 of 54) indicated that it is the cluster-type design that imparts this effect (versus 13 of 54, 24%, who attributed this advantage to row-type designs.

The final concern of our data analysis was respondents' written attributions for survey items 1 and 3. To evaluate these responses we first transcribed them verbatim, then subjectively distilled, for each seating design type, a smaller number of attribution categories. Independently, two of the study's co-authors then categorized every attribution response (with 88% and 92% agreement rates for items 1 and 3, respectively), later resolving non-agreements through collaboration. For both items, Table 3 shows the most frequent category attributions cited for each seating arrangement type. After qualitatively examining these data for the two most popular arrangement types (rows and clusters), we concluded that the advantages of the former (rows) are perceived to be effected primarily through control of some important influence in the physical classroom setting (e.g., noise, behavior distractions, the visibility of teacher-presented instruction), whereas, for the latter (clusters), they are transmitted through some putative social effect (such as cooperative learning, peer tutoring, classroom unity).

Summary and Discussion

To the extent that the outcomes of this study are reliable and representative, our findings reveal a significant, contemporary shift in elementary seating design preferences away from row designs to the use of cluster arrangements. This result is not particularly surprising given the growing popularity of small group "cooperative learning" teaching methods, for which proponents claim a variety of advantages including superior student academic achievement, social behavior, school attendance, self confidence, motivation, and acceptance of cultural difference (e.g., Cohen, 1994; Flanagan & Faison, 2001). Indeed, many of these advantages were cited as rationale by cluster design advocates in the present study. On the other hand, cooperative learning authorities assert that such beneficial outcomes occur only when certain teacher-managed conditions are maintained (such as "pro-social behavior", "positive interdependence", and "individual accountability"; e.g., Slavin, 1990). Can it be true, then (as many of our teacher respondents apparently believe), that these, and other potentially important conditions of learning (like "peer tutoring" and "classroom community") will eventuate simply because students' desks are arranged in clusters? This is a question that remains to be answered.

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Table 1
Part I Seating Design Frequencies Summarized by Grade Level

Grade	(Tchr N)	Cluster	Row	Perimeter	Cluster-Row	Cluster-Perimeter	Row-Perimeter	UC[a]
		Seating Design Category						
K	(15)	15	0	0	0	0	0	0
K/1	(16)	15	0	0	0	1	0	0
1	(44)	35	7	1	1	0	0	0
1/2	(8)	8	0	0	0	0	0	0
2	(47)	32	7	2	3	1	2	0
2/3	(13)	11	2	0	0	0	0	0
3	(46)	36	4	3	0	1	2	0
3/4	(3)	3	0	0	0	0	0	0
4	(44)	30	9	2	0	1	1	1
4/5	(15)	13	1	0	0	0	1	0
5	(43)	24	10	3	3	0	3	0
Totals	(294)	222	40	11	7	4	9	1
% Current		76%	14%	4%	2%	1%	3%	0%
% Knauss		35%	44%	4%	3%	1%	11%	2%

[a] UC = Unclassifiable

Table 2
Teacher Survey Respondents Summarized by Grade for Items 1 and 2-3 [a]

Grade	Item 1	Items 2-3
K	9	9
K/1	6	0
1	18	15
1/2	6	0
2	22	15
2/3	0	0
3	26	17
3/4	0	0
4	23	17
4/5	6	2
5	22	16
Totals	138	91

[a] Mean years teaching experience for all 138 respondents = 13.90 (SD = 10.10).

Table 3

Highest Frequency Seating Design Attributions Summarized for Survey Items 1 and 3

Item 1

Row Attributions (N = 63):

1) Minimizes room distractions (N = 16)
2) Supports appropriate visual orientation toward instruction (N = 12)
3) Supports the learning of appropriate classroom behaviors (N = 11)

Cluster Attributions (N = 130):

1) Supports cooperative/collaborative/shared learning processes (N = 23)
2) Provides best use of room space (N = 20)
3) Promotes students' learning of cooperation skills (N = 16)
4) Builds classroom "community" (N = 14)

Perimeter Attributions (N = 23):

1) Supports appropriate visual orientation toward instruction (N = 7)
2) Reduces disruptive student behaviors (N = 4)
3) Students enjoy it (N = 4)

Row-Perimeter Attributions (N = 10):

1) Reduces student talking distractions (N = 3)
2) Supports appropriate visual orientation toward instruction (N = 2)

Cluster-Perimeter Attributions (N = 4):

1) Supports appropriate visual orientation toward instruction (N = 2)

Item 3

Row Attributions (N = 12):

1) By supporting students' attentiveness (N = 8)

Cluster Attributions (N = 34):

1) By facilitating a cooperative learning process (N = 12)
2) Through the effects of peer tutoring (N = 6)
3) Through the effects of the sense of community it fosters (N = 4)

Perimeter Attributions (N =2):

1) By making students visible to each other (N = 1)
2) Through the effects of the sense of community it fosters (N = 1)

Perimeter-Row Attributions (N = 3):

1) By supporting students' attentiveness (N = 2)

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