

Evaluating Design Enhancements to the Tablet Arm Chair in Language Instruction Classes at UNC Chapel Hill

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Higher education institutions are increasingly interested in cost-effective classroom furniture solutions that support diverse teaching methods by facilitating movement between lecture and interactive instructional methods such as small group work. Several furniture manufacturers are exploring designs based on the traditional tablet arm chair. A study at The University of North Carolina at Chapel Hill piloted one such product in a classroom being used by language instructors. Student and faculty attitudes about the chair were generally positive, although other constraints to adoption merit further exploration.

Background

Much has been written in recent years about the need to rethink learning space design, both in familiar learning spaces such as the classroom and beyond (Milne 2006; Savin-Badin 2007; Grummon 2009). Some scholars have proclaimed “the death of the traditional classroom as we know it”, citing the importance of informal learning space outside the classroom and a more flexible perspective necessary to bridge instructional and social design goals (Jamieson, Dane, and Lippman 2005). A holistic approach to learning space design holds great promise for new buildings and major renovations. Unfortunately, much of the time that students set aside for learning does and will continue to take place in classrooms that are not scheduled for major renovation, and in buildings that were not designed with broader learning goals in mind. As a result, most institutions are left to consider more immediate options for making classroom space suitable for the evidence-based interactive instructional methods that a growing number of faculty members are adopting (Davis 2009).

Instructional methods that promote active learning and student interaction are influenced by a number of classroom variables. The type of furniture and the ease with which it can be reconfigured during a standard class session are among the most important (Oblinger 2006). Since the default configuration for most classrooms is to have all student seats facing the front of the room, furniture must be

moved to promote direct eye contact during class discussions or interaction during small group activities.

While the act of moving a single piece of furniture is not particularly time-consuming on its own, it is likely to become more disruptive when faculty members want to move back and forth between lecture and interactive methods multiple times during a class period. Most students must get out of their chairs in order to move them. Many instructors also report that moving furniture is noisy, both inside the classroom and in rooms located below the classroom.

A recent survey conducted among faculty members at The University of North Carolina at Chapel Hill underscores many of these challenges and points to the need for alternative furniture solutions that facilitate, rather than discourage, interaction in the classroom (CFE 2012). Among the relevant findings, 62% of faculty members surveyed identified the ability to move around the classroom and interact with students as a very important consideration when selecting a classroom. More than 90% reported using as least one interactive instructional method such as class discussion or small group activities on a regular basis, and nearly 70% reported using at least two interactive instructional methods on a regular basis. Some of the faculty comments collected through open-ended questions also suggest that there is an instructional cost associated with *not* exploring furniture and configuration solutions that promote interaction.

“If I were in rooms in which furniture could be moved, I would be more inclined to try group discussions and other activities that I presently do not do a lot with.”

- Biology Professor

Other constraints, of course, must be considered besides instructional effectiveness of classroom furniture and its configuration. Among them are the limitations of a given

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Figure 1. Traditional tablet arm chair.



Figure 2. Experimental tablet arm chair (KI Learn2™)

classroom’s footprint and sight lines, the price point compared to traditional furniture models and the amount of additional space, if any, that the new design requires. As with most interactive classroom designs, promoting student and instructor movement within the classroom generally requires additional open space compared to classrooms designed to maximize occupancy. Campus groups with classroom oversight roles often struggle to strike an appropriate balance between classroom capacity and instructional best practices. At institutions that are trying to increase enrollments this is particularly challenging.

In recent years furniture manufacturers have begun responding to the growing interest in interactive pedagogy with a variety of new products. Some of the most cost-effective solutions are updates on traditional designs. Take, for example, a series of competing products now on the market that is based on the standard tablet arm chair (Figure 1). The tablet arm chair is almost ubiquitous in campus classrooms throughout the world. The primary enhancements to the design include the use of casters, more flexible surface work space, and beneath-seat storage options for student book bags and other personal items. None of these represent revolutionary innovations, but together they begin to address a pressing need in the typical college classroom.

The Node by Steelcase was one of the first on the market and the results of its recent collaboration with the University of Michigan suggest that straightforward enhancements to a traditional design hold promise (Steelcase 2010). In spring 2012, the Center for Faculty Excellence and the Department of Romance Languages and Literatures at the UNC Chapel Hill collaborated with furniture manufacturer Krueger International (KI) to pilot a new tablet arm chair with similar design goals called the Learn2™ (Figure 2). The project was undertaken with the cooperation and support of other campus organizations with key roles in classroom design, support, and policy,

including Information Technology Services, the University Registrar, and the Classroom Policy Steering Committee. The tablet arm chair model represented in Figure 1 is very similar to the model used as the control for this study. The Learn2™ differs in several ways as outlined in Table 1.

	Traditional tablet chair	KI Learn2™
Foot type	Glide	Soft casters
Surface size	10" x 12"	13" x 21.5"
Accommodation of left hand students	2 left-hand chairs for every 12 chairs in the classroom	All chairs can be adjusted to support either right-hand or left-hand use
Distance of tablet from chair back (student mid-torso)	Fixed (13")	Adjustable (14" to 17.5")
Distance of tablet bottom to seat (student lower-torso)	8"	9.5"
On-chair storage options	None	Slanted racks
Seat swivel	None	28 degrees left and right from center

Table 1. Class time devoted to group activities by condition.

Spring 2012 Pilot

During the Spring 2012 semester, four instructors teaching Spanish language and culture courses agreed to use the experimental furniture. Each instructor had taught her course at least three times previously, one as many as 17 times. Total enrollment across all four courses was 74, each at approximately 20 students. All the instructors completed a survey before the semester began about their preferred instructional methods. The instructors reported making significant use of small group and discussion activities during typical class sessions when they had taught the course in the past (see Tables 2 and 3). All reported on

EVALUATING DESIGN ENHANCEMENTS TO THE TABLET ARM CHAIR

average moving furniture for class activities between two and five times per class session.

Group Activities		
Condition	Range	Mean
Experimental	30% - 60%	44.2%
Control	30% - 65%	46.3%

Table 2. Class time devoted to group activities by condition.

Class Discussion		
Condition	Range	Mean
Experimental	10% - 30%	20%
Control	12.5% - 40%	30.6%

Table 3. Class time devoted to class discussion by condition.

All four experimental courses were taught in the same room, 201 Dey Hall. Traditional tablet arm chairs were used during the first half (eight weeks) of the semester. During spring break, the 35 traditional tablet arm chairs were replaced with 28 experimental Learn2™ chairs. The decision to reduce the number of seats was based on a preliminary estimate as to how much additional space would be necessary to realize the intended instructional benefits of the new furniture.

Students were asked to complete two surveys, one just before the experimental furniture was installed and a second one at the end of the semester. Some survey questions focused on how well the desks the students were using fit them as well as how regularly they used their desktops. For example, when the experimental group was asked how well the traditional desk fit them, 57.5% reported the desk being too small. At the end of the semester, 93.9% of these same students with the Learn2™ chairs reported the fit to be just right. A further change was seen in student use of the desktop for positioning their textbooks and/or taking notes. At the beginning of the semester, 89% of the students reported regularly using the desktop to take notes; by the end of the semester 93% of the students reported regularly using the desktop to take notes. The following are comments from the pre-survey demonstrating student dependence on the desktop for books and materials as well as size of the traditional desk.

"They are incredibly small and uncomfortable and the writing surface is tiny."

"The desktop is too little for my book and notebook."

"The desk is too small --> have to hold textbook in your lap if you want to write on it. Also desk is slightly slanted, so pencils, etc., roll off it easily."

Student comments on the level of difficulty of positioning materials on the desktop are further reported in the following section.

Other survey questions focused on the ease with which the furniture could be moved, the ability of students to shift their orientation while they were seated, work space accommodation, and general comfort. Figures 3 and 4 show some of the findings for these inquiries 1) by condition and 2) by pre- and post-survey. Students were also asked open-ended questions about what they liked most and liked least about each chair. In order to provide an additional control for the study, 51 students enrolled in three Spanish courses taught in an adjacent classroom (Dey 208) also completed mid-term and end-of- semester surveys. This classroom was outfitted with traditional tablet arm chairs for the entire semester.

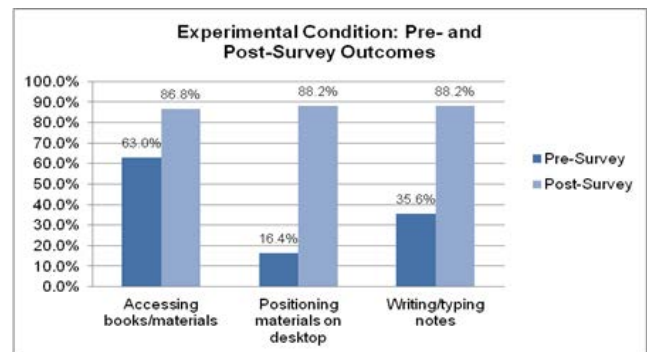


Figure 3. Pre-/Post-survey for experimental condition: Reported ease while working at desks during class.

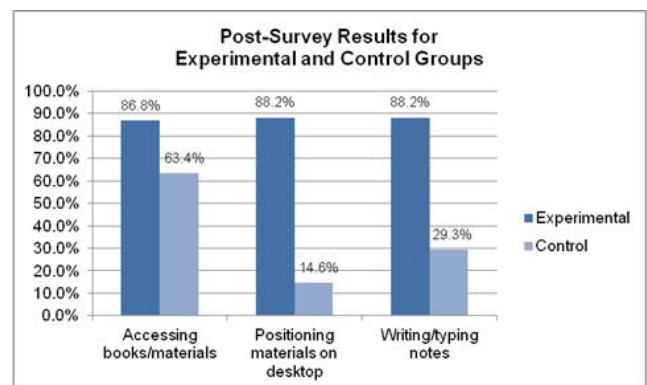


Figure 4. Post-survey by condition: Reported ease while working at desks during class.

Focus groups were conducted in order to learn more about student and instructor attitudes about the new furniture. Eight students representing two of the intervention courses participated in two student focus groups. Joining the four participating faculty members in the instructor focus group were two additional Romance Languages faculty members who taught in the experimental classroom but did not administer pre- and post-intervention student surveys.

Finally, class sessions for three of the participating instructors were videotaped, before and after the experimental furniture was installed. The video was used to confirm findings that came out of the surveys and focus groups.

Student attitudes

The surveys for both the control and experimental classrooms were designed to provide a comparison between student experiences with the traditional and the experimental furniture. A review of the pre-survey findings across both these conditions found no significant differences in student responses about the traditional desks. By the end of the semester, however, significant differences were seen between these two conditions.

This section provides significant findings based on student time and effort to move the desks into groups, ability to move around and communicate with other students, and ability to utilize their workspace.

Key survey findings

Given the number of times that instructors reported having students move their desks into groups, several survey questions attempted to get at differences in the level of class disruption caused when furniture was moved. Students reported it taking less time and effort¹ to move the experimental furniture into small groups. The chairs were also reported to be less noisy to move.

- 15% of students using the experimental furniture reported needing to stand up to move their desks, compared to 82.2% of students using the traditional tablet chairs.
- 6.1% of students using the experimental furniture reported it taking either a lot or some time to move their desks into small groups, compared to 57.5% of students using the traditional tablet chairs.
- 2.9% of students using the experimental furniture reported either a lot or some noise in the classroom when moving their desks into small groups, compared to 89.0% of students using the traditional tablet chairs.

When students moved the traditional desks into groups, some students ended up facing the back of the classroom. This was confirmed watching the videotaped experimental classes. While students worked in their groups, the instructor would initiate a class discussion. When using the traditional desks, some students would end up with their backs to the instructor. Unlike the traditional desks, the experimental desks allowed students to move around easily in their seats and face the instructor. In the survey, students reported the experimental furniture to be more flexible, allowing students to move around easily in them to see the instructor, the presentation/board, and to work and communicate with others easily during small group activities.

- 95.5% of students using the experimental furniture agreed/strongly agreed that the desk allowed them to work and communicate with others easily during small group activities, compared to only 43.8% of students using the traditional tablet chairs.
- 91.2% of students using the experimental furniture agreed/strongly agreed that they could easily move around in their desks to see what was going on in the classroom, compared to only 37.0% of students using the traditional tablet chairs.

The video also showed how students depend on their desktop working surface. Many students had their notebooks open and used the surface to read and write. Students reported an increase in their ability to utilize their work space with the experimental furniture. There was an increase in their ability to access materials, position materials (textbooks and laptop), and write/type notes while working at their desks. The larger surface size of the Learn2™ was an important factor here.

- 88.2% of students using the experimental furniture reported it to be easy/very easy to position their materials (e.g., laptop, textbook, notepad) on the desktop for use when sitting/working at their desks, compared to only 16.4% (14.6% for additional control) of students using the traditional tablet arm chairs.

Comments from the student focus groups served to underscore many of the survey findings, and also identified some shortcomings of the furniture that can be used to inform future use of the chairs in 201 Dey Hall and classroom furniture acquisition decisions.

Students in the focus groups identified the following as the primary advantages of the Learn2™ over the traditional furniture:

EVALUATING DESIGN ENHANCEMENTS TO THE TABLET ARM CHAIR

- Greater mobility afforded by the wheels, facilitating group formation and interaction.
- Ease of use and comfort advantages provided by the writing surface area.
- The ability to adjust the desk to fit different student body types.



Figure 5. Experimental furniture being used for small group work.



Figure 6. Students making use of enhanced tablet space.

The following student comments are representative of those collected:

"It is a lot easier [to do group activities]; you don't have to pick them up or push them and have that annoying sound it makes. I think my professor has more group activities now. When we worked in a group [traditional desks], we just would work with the people immediately next to us so we wouldn't have to move. Now because of the chairs, she'll pair us up, like across the classroom...then you can just roll your desk to them."

"Because the desk is wider and you can move it around. It is really a lot more convenient to arrange your stuff than it used to be, like you used to have to balance like your basic notebook and your folder and your pen and pencils and now you have the space and you can have out everything you need."

"I am too small, so I bring the desktop in closer to me."

"I have super long arms so I have this problem all of the time, with this desk, I have plenty of room."

The concern mentioned most frequently by students about the experimental furniture had to do with storage options for book bags. The slanted racks beneath the Learn2™ designed for storing books were used by very few students. Most students relied on their book bags for removing and storing class texts and other materials. A few students said that the racks were too small for most of their textbooks.

The following student comments are representative:

"I had chairs like this at my high school; but they had an under bin storage, so I like always expected that there would be an under bin storage....I would put whatever materials we are not using in there....instead of on the ground."

"I keep my books in my book bag and the things on the side are too small for my book bag."

Faculty attitudes

Like the students, faculty members also appreciated how the experimental furniture facilitated the movement of chairs for small group work and the ability of students to personalize the desk as a learning space.

A total of 8 of 9 instructors (5 experimental and 4 control) reported "group" activities as a method of learning in their classrooms. These group activities ranged from playing games "...like Password, Jeopardy..." to "discussions" and "dialogue/completing tasks". The following are some of the comments provided by instructors for group activities:

"When playing games like password, jeopardy or roulette; also just when working to complete a task in pairs or groups of 4."

"Changing partners, changing group size, creating space for games, skits, dialogues, and other presentations."

"Small group conversation cooperative activities."

During the focus group, faculty were asked to share their thoughts about the experimental furniture. The following are some comments representative of those collected during the instructor focus group:

"...what was nice for me is that they could get in their groups more efficiently and more quietly."

"I like that they were quiet and you could move them around. I also found that you could configure my relationship with my students better. If I really wanted to ... I dragged their chairs close to me, just brought them close to me and said, "okay, we are going to talk". The whole gesture of bringing them together to me and putting them all really close together, so I could say what I wanted to say to them slowly and low was very effective, powerful....bringing them close as a team worked really well."

"..and it was adjustable from left to right, but also they could bring it closer or not, depending on the size of the student."

"I preferred the new furniture, because of the way I teach 105 [Spanish for High Beginners] and we need to do all kinds of activities and it was so much easier than the dragging [of] the chairs. There are classrooms underneath and you can always hear the ones above are always scraping the floors, you can hear that. These were not."

Several faculty members noted that student backpacks placed next to chairs can impede instructor movement throughout the room. At times the backpacks also served as impediments to the movement of the Learn2™ chairs. The following are comments that were made in the survey as well as in the focus group in regards to the backpacks.

"Because the old ones, old desks didn't roll, the backpacks stayed closer to the desks, to the person who was using it. But, because these [the new chairs] roll, they would roll away from the backpack and the backpacks would be left in the middle of nowhere."

"No place to put the backpack underneath. I think underneath is a better location because it frees up the space that would be taken by the backpack (if the students put them either on the floor or the back of the chair)."

"Bottom is useless and backpacks cannot be stored under the desk."

Instructors suggested during the focus group that encouraging students to hang their book bags on the back of the chairs may be an immediate option to help address this issue.

Faculty members were also more likely to identify noise reduction as an advantage. The instructors in the experimental classroom who reported the traditional desks making a lot or some noise via the pre-test reported the experimental desks making only a little to no noise on the post-test. When asked what they liked most about the

experimental desks, the noise reduction was mentioned. Below are a couple of comments that were provided by faculty regarding the noise reduction.

"No noise; Easy to form small groups."

"The noise factor has been reduced considerably. I find myself using the desks as props for an activity. Students seem more relaxed."

There was no consensus among the faculty members who used the experimental classroom about how many additional chairs the room could support without undermining the instructional benefits afforded by the new furniture. The 28 seats used for the pilot represent at 20% loss of seats from the number of traditional tablet arm chairs (35) that were in the room previously. Additional experimentation will be required to determine the optimal ratio.

Conclusion

The purpose of this article is to share student and faculty attitudes about one of several products in a new line of classroom furniture that builds on a traditional design, the tablet arm chair. The enduring popularity of the tablet arm chair on college campuses stems largely from its efficient use of space and portability. Furniture products that retain these advantages and can also facilitate classroom reconfiguration and student personalization may represent an example of a transitional design that can help bring older classrooms in line with prevailing pedagogies. The results of this study suggest that the design enhancements represented in the KI Learn2™ facilitated interaction for both students and instructors who participated. Additional study is required to determine optimal space/seat ratios for this design. It is also too early to estimate the price differential between the traditional and emerging generation of tablet arm chairs.

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EVALUATING DESIGN ENHANCEMENTS TO THE TABLET ARM CHAIR

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