USING INSTRUCTIONAL METHODS AND INFORMATION TECHNOLOGY TO PROMOTE COLLABORATION AMONG STUDENTS

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ABSTRACT

As teams have become more important in organizations, a similar emphasis on collaboration has grown in business schools and IS programs. Yet teachers often struggle with how best to teach students to work collaboratively and how to assess the affect of instruction designed to promote collaboration. In this study, we examine the impact of instructional methods and information technology on student learning styles using the Grasha-Riechmann Student Learning Styles Scales, with an emphasis on assessing students’ preference for working collaboratively. Specifically, we look at (1) measuring a student’s preference for collaboration as a learning style and (2) assessing how specific instructional methods and the use of information technology affect a student’s learning preference for collaboration. The results of the study show that students’ preference for collaboration can significantly increase through specific instructional strategies coupled with the appropriate integration of information technology.

Keywords: Learning styles, student learning, collaboration, teams, instructional methods.

INTRODUCTION

The importance of teams has grown in the corporate environment during the past few decades as an increasing number of organizations have turned to collaborative models of work. In like manner, IS staffs have turned to teams as a way to leverage resources and improve work products and systems. A similar emphasis on collaboration has surfaced in business schools and IS programs as well as in other disciplines. The impressive results of teams in organizations have bolstered their popularity. Teams can bring potential advantages to the workplace and to the classroom—enhancing communication and decision making; increasing productivity with higher levels of involvement, commitment, motivation; improving processes; and distributing workloads.

Yet in educational settings, teachers often struggle with how best to teach students how to work collaboratively. Traditional methods of team assignments and group work in the classroom have, at best, produced mixed results with varying levels of success and questionable levels of satisfaction among students and teachers. Additionally, instructors remain uncertain whether learning objectives and outcomes have resulted in students’ increased ability or preference for working in teams.

In this study, we examine the impact of instructional methods and information technology on student learning styles, critical factors affecting student learning. Specifically, we look at (1) measuring a student’s preference for collaboration as a learning style and (2) assessing how specific instructional methods and the use of information technology affect a student’s learning preference for collaboration.
Using the Grasha-Riechmann Student Learning Styles Scales (which measures collaboration as a learning style preference), we assessed changes in student learning styles over the course of a semester in three college-level courses. Through specific instructional intervention coupled with collaborative projects and the use of course-management software, the results of the assessments showed a significant increase in students’ Collaborative learning style (along with their Participant and Independent styles) over the course of the semester. This paper details many of the instructional strategies employed and the information technology used to promote effective collaboration in the classroom and discusses some implications for additional research and practice.

This study builds on a research framework adapted from the technology-mediated learning framework proposed by Alavi & Leidner (1), which suggests that we consider factors like instructional methods along with student learning processes to better understand the role of information technology in teaching-learning processes. In this study, we use the construct of learning styles to help understand these learning processes. By examining the impact of instructional methods and information technology on the learning styles of students, we specifically examine the following research question: How do collaborative instructional strategies integrated with appropriate information technology impact students’ learning styles, specifically a student’s preference for working collaboratively?

In this research we use a learning styles model developed by Grasha-Reichmann (4), which includes six dimensions or preferences for learning: Independent, Dependent, Competitive, Collaborative, Avoidant, and Participant. In addition to having a specific dimension measuring collaboration, this model differs from other models in that it is based on how students respond to classroom instructional activities rather than assessing student personality or cognitive traits. The model suggests learners exhibit all traits but that they usually display preference for a particular dimension. Grasha (3) also asserts that through instructional intervention, preference for a particular learning dimension can change. The six learning preferences are assessed through an instrument called the Grasha-Reichmann Student Learning Style Scales (GRSLSS).

**METHODOLOGY**

At the beginning of the semester, demographic data was collected and students’ learning styles were assessed using the GRSLSS. The initial data collection established a baseline from which any changes in preferences that may have resulted from specific instructional strategies and technology use could be measured. The intent was to determine if specific instructions strategies along with the appropriate use of technology could affect students’ learning styles. Since the ability to work collaboratively is critical to success in the workplace, with an increase of cross-functional teams in many organizations (2, 5, 7, 8), we were specifically interested in determining if over the course of a semester changes in students’ Collaborative preference could be affected.

After the initial assessment using the GRSLSS, the authors designed specific instructional activities targeted to the Collaborative learning preference. Although instructional strategies were included to accommodate all the preference areas, specific interventions were planned in an attempt to assess if differences in the Collaborative learning style could be affected.
As part of the instructional strategy, the instructors used Blackboard (version 5.5) as an integral part of the course. Blackboard is a popular course management application distributed and used via the Internet and is utilized by the universities where the study was conducted. As noted, Blackboard facilitates the distribution of information electronically and allows students and teachers to communicate through such things as email, threaded discussions, and synchronous chat sessions. Students can post information about themselves, and group areas can be set up to facilitate specific work in teams. Students also have the opportunity perform additional tasks, such as view course notes, slideshows, and handouts that have been posted as well as check scores on assignments in a grade book section.

A discussion of the participants in the study and the instructional strategies implemented in connection with using Blackboard as a technology tool follows.

Description of Participants
This study included a sample group of 65 students enrolled in three classes: two special education methods classes (combined graduate and undergraduate students) and one introductory IT class. The classes were taught during a six-week summer session at two medium-sized Midwestern Universities. Forty-eight students were enrolled in the Special Education Methods class and 17 students were enrolled in the IT course. Out of the 65 students, 27 students (41.5%) were graduate students and 38 (58.5%) were undergraduate students. Fourteen (21.5%) were male students and 51 (78.5%) were female. Students in the study declared various majors, although the majority of students were education and business majors.

Review of Instructional Methods and Information Technology Used
Building upon instructional strategies and processes suggested by Grasha (1996), the instructors designed assignments and activities to promote collaboration among students, along with opportunities for students to strengthen other less dominant learning preferences. The two learning preferences most targeted were Collaboration and Participant, learning styles most directly related to goal of promoting collaborative skills in students. Although it is important to support all preferred learning styles of students, additional research suggests that helping students develop less preferred learning style allows them to become more versatile learners and encourages them to develop skills required for real world (3, 6).

Along with specific instruction aimed at promoting collaboration, the instructors carefully considered how to integrate technology into their courses. The aim of integrating the technology was to create learning environments suitable for all learning styles while promoting collaboration. The following discussion identifies some of the instructional activities and technology used in the courses and explains the learning styles they were intended to develop.

One of the most pervasive strategies used throughout the courses was online discussions. Blackboard contains several tools that allow for online interaction and that encourage active participation, including a discussion board that allows for asynchronous postings and a virtual classroom that provides synchronous chat-like interactions. Both types of online discussion were used in the courses to explore various topics. This method (coupled with a required number of postings per week by students) gave students the opportunity to reflect on questions and
thoughtfully respond to issues. In addition to interacting in discussions as an entire class, teams formed and maintained throughout the semester were required to engage in discussions specific to the group, involving collaboration among group members. Collaborative, Participant, and Dependent were the targeted learning styles for these instructional interventions.

In addition to online discussions, each course required various types of electronic collaboration, specifically focused to the Collaborative and Participant styles. During the course, student teams were required to complete a major project: a webliography of material and resources relevant to the course and its content. Blackboard and other technologies were used to promote interactions and facilitate collaboration among group members. For instance, students were asked to exchange files electronically, along with communicating with other group members through email and group discussion forums. The final project was posted electronically and became a resource accessible to the entire class, further promoting collaboration and participation among students.

Related to the electronic collaboration were several web-based assignments, focused on Collaborative, Participant, and Independent learning styles. Although individual web-assignments were given to support students who preferred to work alone, students often had to compare their work within their groups, sometimes being required to reach some consensus on an issue they had individually studied. These tasks promoted independent learning (students participating actively in their own learning) while encouraging an exchange of ideas through participative and collaborative engagement after the individual effort.

Leveraging the use of technology, the courses were supported with the posting of online lecture notes. Realizing that some students were more instructor dependent than others, Blackboard provided a means to support these students as well. All PowerPoint lecture notes were posted in the course Blackboard shell, providing guidelines, structure, and reinforcement for students needing it. This strategy also encouraged participation among learners who previewed material before coming to class to be prepared to more actively participate and discuss issues.

Since learning to use technology was an integral part of all the courses (the IT course included hands-on lab time learning Microsoft Office while the education courses included specific work with utilizing Internet resources and learning and using PowerPoint), self-paced learning modules were provided that related to the technology being learned. For instance, in one class, students completed three short self-paced units on PowerPoint, learning how to integrate advanced features into a slideshow. This approach developed an Independent learning strategy but was also supported by Participant and Collaborative styles. Individuals turned to others within their teams when encountering problems. Additionally, a specific discussion thread was set up to address questions about technical issues and to share tips about specific software applications—helping to encourage the Collaborative and Participant dimensions.

Several additional web resources that were related to the course content were provided on the course website. For example, when databases and various information systems were discussed in the IT class, students applied information from the text by locating and trying several existing databases and systems, with results shared and compared among group members. Additionally, group members compared their experiences shopping online and contrasted their encounters at
several sites. These resources and assignments gave the Independent and Participant learners an opportunity to learn more information related to the content of the course while encouraging the interaction and sharing of information among group members.

Perhaps the most significant instructional strategy used to promote collaboration was the heavy reliance upon teams. Students were divided into teams of 5-8 at the beginning of the semester, with specific instruction given on working and functioning in teams. Some team-related activities occurred every week, often with each class session. These teams were maintained through the entire semester. During the course of the semester, group members begin to rely on one another, seeking help from one another in assignments and studying for exams, even without the direction of the instructors. Through an emphasis on teams and demonstrating the value of teams early in the semester, students seemed naturally to seek opportunities to work collaboratively in these groups.

Implementing specific instructional activities such as those described—integrated with Blackboard (the primary technology)—the instructors attempted determine what impact the interventions had on students’ learning styles. At the end of the semester, the GRSLSS was given again to determine any changes in students’ learning style preferences related to the experiences they had had in the class.

**RESULTS**

An analysis of the learning style data at pre-test indicated initial preferences of students for the different learning styles. The initial assessment showed that students scored high on Participant, Collaborative, and Dependent learning styles, suggesting an openness among students for collaborative projects and opportunities to actively participate in the class. They also had a high score on the dependent learning style, suggesting that many preferred teacher-centered instruction, including such things as outlines, notes, and clear instructions. Their least preferred styles were Avoidant, Competitive, and Independent Learning styles (see Table 2). Differences among graduate, undergraduate, gender, and major were not analyzed because of unequal cell sizes.

Although the pre-test showed students scoring high in the Collaborative and Participant styles, the instructors were hopeful of increasing the scores in these areas—particularly the Collaborative dimension—through instructional intervention and the use of technology.

After implementing the instructional strategies described earlier, post-test students showed highest scores in Independent, Collaborative, and Participant learning styles. A T-test analysis of the pre- and post-test scores indicated that there was a significant increase in the Independent, Collaborative, and Participant learning styles over the course of the semester. Table 2 shows scores for the learning styles from the pre- and post-test assessments.
Table 2. Changes in Student Learning Styles from Pre-test to Post-test.

<table>
<thead>
<tr>
<th>Learning Styles</th>
<th>Pre-test</th>
<th>Post-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent</td>
<td>3.34</td>
<td>3.43 *</td>
</tr>
<tr>
<td>Collaborative</td>
<td>3.86</td>
<td>3.99 *</td>
</tr>
<tr>
<td>Dependent</td>
<td>3.58</td>
<td>3.68</td>
</tr>
<tr>
<td>Participant</td>
<td>3.95</td>
<td>4.06 *</td>
</tr>
<tr>
<td>Competitive</td>
<td>2.35</td>
<td>2.33</td>
</tr>
<tr>
<td>Avoidant</td>
<td>2.11</td>
<td>2.39</td>
</tr>
</tbody>
</table>

*Significant at p< .05 level

DISCUSSION

The purpose of this study was to determine students’ preferred learning styles and to examine the influence of instructional methods and information technology on these styles, particularly the Collaborative dimension. Specifically, the instructors were attempting to determine if students’ learning styles do change as a result of instructional methods and information technology. In the study, instructional methods and technology were designed to accommodate the different learning styles of students, with activities also being structured in a way to help students strengthen less dominant learning styles along with promoting the Collaborative style. The results indicate that at pre-test, most students preferred a Participant learning style, although they also scored high on Collaborative and Dependent learning styles.

After participating in class activities—supported with technology—students showed a significant increase in the Independent, Collaborative, and Participatory learning styles, suggesting that learning styles can change through specific instructional intervention and the appropriate use of technology. This is an important finding because it shows that instructors can help students develop skills to become active participants in the learning process and to develop collaborative skills. The data also shows that students are able to change or strengthen a learning preference, as in the instance of the significant change from a Dependent learning style to an Independent learning style.

CONCLUSION

This study provides a foundation for additional research, demonstrating the benefit of integrating the study of teaching styles, learning styles, and technology. The data from the study suggests that instructional strategies along with appropriate use of information technology can impact student learning styles.

Limitations of the study provide areas for future research. Previous research has found some relationships between learning styles related to age, gender, major, and graduate/undergraduate status. Additional research should explore these differences. Also, further studies should look not just at the impact of intervention and technology on learning styles but should measure their effect on student learning as well—since the ultimate goal is not merely to change learning styles but to improve student learning. Said another way, how does an awareness of student learning styles combined with instructional strategies and technology affect student learning and influence the realization of specific learning outcomes? Assessing changes in learning styles...
becomes more important in the context of improving student learning. Additional research can assess how specific instructional strategies and information technology enhances student learning and performance—not just students’ learning styles.

This study augments our understanding of the teaching-learning process by showing evidence that what we do as teachers and how we structure our courses impacts student learning preferences, a critical factor in student performance. As we move into an era of greater accountability in education through outcome-based measures, an understanding of how students learn and how we as instructors can increase student learning becomes more critical. Better understanding the teaching-learning process can help instructors become a more significant factor in promoting greater student satisfaction and achievement in learning, helping students become more successful in their schooling and in their lives.

In addition, this research also suggests that as instructors we can help students develop their preference for and ability to work collaboratively. Although the benefits of teams continue to be advocated in today’s world, many educators and students still experience the frustrations involved with ineffective teams. Although no magic formula exists for creating successful teams either in the workplace or in academia, the results of this study suggest that an individual’s preference for learning and working collaboratively can be measured and can be influenced through focused instructional methods and the appropriate use of information technology.

REFERENCES