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The Journal of Effective Teaching is currently being redesigned. Please submit papers for future issues after May 15, 2018. In the future, the journal will be called the Journal of Effective Teaching in Higher Education. Articles will continue to be accepted in any of the Content Areas supported by the journal.
INFORMATION FOR AUTHORS

The Journal of Effective Teaching is an electronic journal devoted to the exchange of ideas and information about undergraduate and graduate teaching. Articles are solicited for publications which address excellence in teaching at colleges and universities. We invite contributors to share their insights in pedagogy, innovations in teaching and learning, and classroom experiences in the form of a scholarly communication which will be reviewed by experts in teaching scholarship. Articles should appeal to a broad campus readership. Articles which draw upon specific-discipline based research or teaching practices should elaborate on how the teaching practice, research or findings relates across the disciplines. We are particularly interested in topics addressed in the particular Content Areas described at this site, including empirical research on pedagogy, innovations in teaching and learning, and classroom experiences.

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Manuscripts for publication should:

- Follow APA guidelines (5th Edition).
- Include an abstract and 3-5 keywords.
- Typeset in English using MS Word format and 12 pt Times New Roman
- Articles/essays on effective teaching should be 2000-5000.
- Research articles should be 3000-8000 words.
- Tables and figures should be placed appropriately in the text.

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Features of Successful Group Work in Online and Physical Courses

Ali Rezaei1
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Abstract

The present study used a unique design in which multiple factors were combined in a multiphase study to find if there are any significant interactions among six factors known to be effective in successful group work. The results indicated that the effectiveness of group work depends on how the effectiveness is measured, how the group is formed, and what type of task is assigned to learners. An interaction of six major factors including mode of instruction (face-to-face vs online), type of task (convergent vs divergent), anonymity of participants, homogeneity of students in terms of their skill level, utilization of peer assessment, and group size, was found to play a significant role in the effectiveness of group work.

Keywords: Group work, group discussion, collaborative learning, active learning.

Many teachers are using group work or group discussion as a teaching strategy in their courses. There is wide agreement among reviewers of the collaborative learning literature that collaborative methods have a positive effect on student achievement in almost any discipline (Bennett, 2015; Katz & Rezaei, 1999; Rezaei, 2014). Group work is beneficial both for students and instructors. For students, group work motivates them, provides a peer instruction opportunity by looking at the problem from multiple perspectives and helps them to become more creative. For teachers, group work is an opportunity to give students more complex and more authentic assignments. A major research question for these instructors is how can a group work activity be more effective and what type of group activity leads to a better outcome. The problem is many teachers design their group work assignment simply based on what they assume will work better rather than using an evidence based decision making. Earlier studies have evaluated the effectiveness of group work mainly through self-report evaluations (Bennett, 2015). Some educators have evaluated the final product of the group work, while others have focused on the quality of collaboration process. As explained in the following literature review, researchers in this field who have compared different types of group work, have focused on only one factor at a time. Some have compared different group sizes and others have compared online with face-to-face group works. Besides, in most of those studies, only a single dependent variable (student satisfaction, amount of collaboration, or students’ grade) has been evaluated.

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Furthermore, the results of research on the effectiveness of group work is not always positive and indeed some researchers have argued that group works in class is not useful at all (Qamar, Ahmad, & Niaz, 2015; Brown & McIlroy, 2011). There is a need to do a more comprehensive research in which several factors are investigated together (simultaneously) to find the interaction effects among these factors. The goal of this study is to identify factors that influence the success of group work in terms of student learning outcome as well as their interest and engagement in class activities and to find out why some researchers have not found group works to be quite successful.

**Literature Review**

Throughout the history of education, the most common teaching strategy used in classrooms has been lectures (Lammers & Murphy 2002). However, this strategy usually lacks many of the components of active learning, such as critical thinking, self-pacing, and the encouragement of dialogue and group discussion (Fredrick & Hummel 2004). Recently, higher education institutions are paying more attention to the development of students’ communicative abilities and critical thinking. Collaborative learning is a key teaching strategy in use for developing these skills. Collaborative learning or group work is an instructional approach in which students work together in small or large groups to accomplish a common learning goal or a well-defined learning task. Collaborative learning procedures have also been shown to enhance student satisfaction with the learning and classroom experience (Grant-Vallone, 2011). Numerous research studies have demonstrated that small-group learning creates situations in which schoolwork is perceived not as a task or chore but as an opportunity to interact on issues of personal importance (Heejin & Windeatt 2016). Johnson, Johnson, and Smith (2006) performed a meta-analysis of 168 studies comparing cooperative learning to competitive learning and individualistic learning in college students. They found that cooperative learning produced greater academic achievement than both competitive learning and individualistic learning across the studies.

The importance of collaborative learning is rooted in its potential for meaningful learning and social interaction. Various theorists, from Vygotsky (1986), to the situated learning theorists such as Lave and Wenger (1991), to the current social constructive theorists (Jong, Lai, Hsia & Lin, 2013), have stressed the importance of social interaction in learning. These theorists propose that learning occurs in a social or inter-psychological context prior to its becoming internalized or individualized within an intra-psychological category (Vygotsky, 1986).

Recently, some authors have questioned whether educators are using group work just because it is popular or there is hard evidence to prove its effectiveness (Brown & McIlroy, 2011). Indeed, there are some negative reports and most of the negative reports are coming from the areas of physical or medical sciences where students work together on a well-defined project and have specific goals to reach. For example, Qamar et al. (2015) reported that “medical students’ discussion intervention” showed poor results in terms of their mean scores in their final professional exam, and their pass rate, and in terms of their perceptions of the course. These authors also reported the results of other studies,
which have revealed students’ negative perspective regarding the worth of “problem oriented interactive sessions”. In a study about course group work in China, students reported: uncertainty on the accuracy of the knowledge acquired, time wasted during the session, inadequate focus in teaching, and heavy workload on the students (Huang, 2005). In a more recent study, Brown and McIlroy (2011) reviewed several articles on students’ perspectives about group work and concluded that rather than learning to value group collaboration, usually, students learned to hate it. The question is why these students were not happy about their group works and what the instructor could have done to change the situation. As Chapman (2005) stressed, merely setting up a group activity is insufficient; “working and discussing with others per se will not necessarily result in higher learning” (p. 289). Asking a group of students to decide if they preferred individual or group work, Brown and McIlroy (2011) found that 68.9% preferred to do individual projects, 26.4% preferred group assignments and 4.6% had no preference. They reported that students’ comments mirrored those issues raised in the literature review regarding time management, personal control, and concern over the quality of the outcome (Cartney & Rouse, 2006). Similarly, Flosason, McGee, and Diener-Ludwig (2015) did not find any clear advantages of group discussion in terms of learning outcomes, although students and instructors alike reported enjoying the classroom. In another case, Lake (2001) reported that in active learning sections (group discussions) students perceived that they had learned less than students in the lecture section, and students’ perceptions of the course and the instructor’s effectiveness were lower; they also had lower perceptions of course and instructor quality.

The negative results in not limited to studies that focused on students’ satisfaction. Several other studies did not find improvement in scores on multiple-choice or essay examinations between courses taught through lectures with those taught through combined active learning and lecture (Lake, 2001). Summers and Volet (2010) found that groups spent only a minority of their meeting time engaging with content; groups largely neglected precisely those types of discussions that were their best opportunity to reap learning benefits from the group work. The researchers concluded that it should not be assumed that group assignments will necessarily give rise to substantial engagement in productive content-related discussions.

In summary, while there are many studies which support group work and group discussion and most of them have reported positive results, the above examples indicate that group work is not always successful and that designing a collaborative environment is not always easy. A closer look at the literature shows that educators have used various group sizes and various ways in assigning students to groups and various types of assignments for group work. In the following section, some of the variables known to impact group work successfully are investigated.

Main Factors in Group Work

Since the above literature review shows group work is not always successful, there is a need to know what type of group work leads to better results and a more positive attitude towards teamwork. Earlier studies evaluated the effectiveness of group work mainly...
through self-report evaluations (e.g., Bennett, 2015). Some educators have evaluated the final outcome of the group work, while others have focused on the quality of collaboration process. The author’s search to identify features of group activities reflected in the ligature, resulted in finding the following six main factors.

**Physical vs Virtual Group Work**

Usually, in virtual group meetings (online discussions), people tend to communicate differently using text as compared to voice used in physical classroom. Therefore, students may communicate more directly and more bravely when writing instead of talking (Eisele, 2013). Since online discussion is time-independent and allows for “many-to-many” interactive communication, it facilitates group work. Therefore, some researchers suggest that online communication can be as effective or more effective than face-to-face collaboration. However, Smith, Sorensen, Gump, Heindel, Caris, and Martinez (2011) noted that students frequently signed up for an online course believing that work in the course will be done individually; therefore, those students may resist team-based approaches to distance learning. These authors report that students in online courses were more negative about group work, than students in face-to-face sections. In a different study, Friedman, Karniel, and Dinur (2009) did not find a significant difference in the social dynamics between online and face-to-face groups.

Overall, research on the relative superiority of online versus face-to-face communication, and their roles in facilitating group work, is not quite conclusive (Smith et al., 2011). It could be concluded to some extent that most of the earlier studies are in favor of face-to-face group work in comparison with online collaboration; however, online group work has its own advantages and can sometimes be as effective. We need to know how can we make both online and face to face group work more effective and how can we motivate students to participate more actively. For example, does it matter if students can participate in a group discussion anonymously?

**Anonymous vs. Non-Anonymous Groups**

Another major difference between virtual and physical discussion is the possibility of maintaining anonymity online. When students learn collaboratively, they generally learn better if they complement one another in knowledge. However, when group members meet face-to-face, they may be influenced by interpersonal relationships and peer pressure, which can cause group members to interact in less academic ways (Jong et al., 2013). Jong et al.’s study concluded that anonymous group discussions tend to generate better results. They argued that when students know one another reasonably well and meet face-to-face, those with a lower learning achievement may tend to rely on those with a higher learning achievement. This can in turn greatly reduce the effects of collaborative learning. Some researchers have suggested that in an anonymous group discussion, students feel safer to evaluate each other’s’ contribution to group discussions (Wen, Tsai, & Chang, 2006). As stated by Jong, Lai, Hsia and Lin (2013), when group members are familiar with one another and meet face-to-face, it is only natural that those who are typically low achievers decide to let those who are typically high achievers give “the right
answer.” This effect becomes even more significant when students with a lower learning achievement also have little motivation to learn.

Anonymity can also promote an objective evaluation of inputs by the recipient since it helps individuals to cognitively separate the message from the messenger. Finally, anonymity may help group members to be open and honest without any direct fear of reprisals, and they can be critical of any views. In summary, while anonymity has a great potential for a productive group discussion, there is not much research to support its effectiveness. A major question remains to be answered is if there is a way to minimize the limitations and increase the advantages. For example, if the members are anonymous but the teacher puts homogenous students together, does it change the outcome of group work?

**Divergent vs Convergent Discussions**

Group tasks have been categorized in several ways. Some researchers have identified three kinds of peer group discussions: disputational, commutative, and exploratory (Tin, 2003). Tin reported that out of the three types of discussion, the exploratory discussion has the highest educational value. As argued by Authors (1999), when peer discussion fails to be exploratory, it may be due to a cumulative effect in which ideas are accepted unchallenged and without justification. Therefore, the vital role of the teacher in this context is to design a collaborative environment that encourages the exploratory peer discussion.

Other researchers have categorized group tasks into well-structured and ill-structured tasks (Jonassen, 1997). Others such as Paulus (2005) have used the terms synthesis and application to categorize group work tasks. The synthesis task requires students to discuss ideas and theories, while the application task asks the group to apply the learning theory to solve a particular learning problem. Jonassen (1997) concluded that when the task is synthesis, groups collaborate significantly more.

According to Jonassen (1997), instructional designs for well-structured problems are rooted in information processing theory while instructional designs for ill-structured problems necessarily borrows assumptions and methods from constructivism and situated cognition. Solving ill-structured problems is largely an iterative and cyclical process. By arguing and counter-arguing learners refine their problem representations and agree on the best course of action.

Finally, researchers such as Tin (2003) categorized group works into convergent and divergent tasks. She also explored what causes students to engage in exploratory talk. She suggested that in convergent (commutative) tasks exploratory talk may not be triggered unless the expert knowledge required to solve the problem is already at the students’ potential or developmental level. She argued that in closed convergent tasks, only one outcome is expected or is true; and the participants need to converge towards a single goal. In open divergent tasks, more than one outcome is possible, and the participants may often end up maintaining their own opinion, even after listening to those of the other partic-
Participants. Following this Vygotskian view of interaction for learning, many educational studies have been conducted, investigating and identifying the features of talk desirable for learning. No matter what one names them or how one categorizes group work tasks, there is enough evidence that these tasks require different types of instructional design. In summary, divergent tasks have a greater potential for a higher level of students’ discussion; however, convergent tasks lead to a more evenly distributed amount of work among group members. A question that remains to answer is what group size (small, medium, large) is the best fit for either divergent or convergent task.

Large vs Small Groups

Although different streams of research have addressed the effects of group size (Mueller, 2012; Wheelan, 2009), the authors have not justified their group size choices theoretically (Cummings, Kiesler, Bosaghzadeh, & Balakrishnan, 2013). According to Steiner (1972), having more members provides more resources available to meet task demands. Larger groups sometimes perform better than smaller groups as a result of having more people. Nonetheless, the potential productivity gained from having more people working on parts of the task can be offset by process losses associated with the need to motivate members to participate and coordinate their work.

In larger groups, each member contributes less, on average, than in smaller groups (Liden, Wayne, Jaworski, & Bennett, 2004). One reason for this decline in marginal productivity is social loafing; some members of larger groups perform less than their share of the work (Brown & McIlroy, 2011). Also, larger groups have more difficulty than smaller groups reaching a common definition of the group’s goals, managing the flow of work, sustaining members’ attention and cooperation, minimizing turnover, and encouraging knowledge sharing over time (Cummings et al., 2013). In summary, there is no consensus on the optimum group size. The big question is if group size has an interaction with homogeneity/heterogeneity of the group members.

Homogeneity vs Heterogeneity of Groups

Homogenous ability grouping is usually used by teachers who want to form more cohesive groups and those who want to avoid free riding in group work. However, Nelson (2008) reports that there is a curvilinear relationship between group cohesion and group functionality. He found that groups with high levels of cohesion function just as poorly as a group with low levels of cohesion. When students of the same ability are placed together, they usually are able to work at about the same pace. Additionally, an ERIC Digest report by Carol Nelson (1994) stated that ability grouping for a particular educational purpose benefits students. In a homogenous ability grouping, the teacher would know how much help is needed for each group and this gives the teacher the ability to adapt instructional content to the level of the group. However, it should be noted that in a homogenous grouping, students in lower groups receive lower quality instruction, work at a slower pace, and can detect a teacher’s decreased expectations of performance and quality of instruction. Heltemes (2009) argued that this is harmful to a low-ability student’s academic achievement, motivation to learn, and self-esteem.
In a heterogeneous classroom, providing individual attention is difficult since group members are not all at the same level. On the other hand, in a heterogeneous group, high-ability students may get a chance to restructure and elaborate on material as they help other students to understand the task (learning by teaching). Moreover, unlike homogeneous groups in which once a student is placed in a group they may get “stuck” in the group, in heterogeneous groups it is not hard to move students (Heltemes, 2009). In a comprehensive research, she placed seventh grade science classes into 16 randomized heterogeneous and homogenous ability groups and tested after each session. Her main findings indicate that high ability students may succeed in either ability grouping style. Medium ability students showed better group performance in homogenous ability groups but tested better as a result of heterogeneous grouping. Low ability students experienced much greater academic achievement because of heterogeneous ability groups. Teachers who let students choose their groupmates, should note that these groups tend to be more homogeneous, in comparison with situations where teachers randomly assign students to groups. There is a need to know how homogeneity of group interacts with other variables such as group size and task type in order to get the best outcome.

Peer Assessment vs Instructor Assessment

Peer assessment happens when the instructor allows students to evaluate each other’s contributions to group work. This benefits students in two ways: assessing peers’ work helps students to evaluate their own work and those being assessed may accept peer assessments more readily than instructor assessments made without seeing the entire process of collaboration (Jong et al., 2013). Although an assessment of overall performance is important, as noted by Baker (2008, p. 183) “when the instructor focuses simply on the end result of a group project, much information is lost about specific task and relationship behaviors that affect group success.” For example, the instructor may not consider the extent to which each group member took initiative, researched the issues, contributed ideas, met group deadlines, contributed to problem solving, and helped resolve group conflict. It is suggested that peer assessment not only helps students to think in a positive way about the evaluation of their work but also helps them to learn better (Rezaei, 2014).

Some instructors put a heavy weight on peer assessment in their grading, while others consider only the final product resulting from the group, and not the individual contributions, (Tinoca, Oliveira, & Pereira, 2007). An important issue is the validity and reliability of peer assessment. Several research studies in the literature have supported the validity of peer assessment (Erez, Lepine, & Elms, 2002; Baker, 2008; Druskat & Wolff, 1999). For example, Baker (2008) compared three peer evaluation methods including two rating scales and single score methods. She concluded that all three instruments demonstrated acceptable levels of reliability and were found to be correlated with individual performance measures. When peers assess each other’s work, they use their own language and communicate in their own way. Compared to the language and approach used by the instructor, peer assessment may help the student being assessed to understand the advantages and shortcomings of his/her work more effectively.
Although some instructors may question the appropriateness of allowing students to influence the grades of their peers, as reported by Baker (2008), many researchers have justified the use of peer ratings for administrative purposes because peers are frequently in the best position to observe relevant behaviors and ratings can be aggregated across peers to increase accuracy. Wager and Carroll’s (2012) findings also suggest that students prefer a confidential questionnaire to conduct peer evaluations and perceive it to be the fairest approach, although also reducing concerns for evaluating shared workload. While peer assessment has the potential to help students learn better, it can also cause anxiety because students may fear that judging one another could lead to hard feelings (Jong et al., 2013). Students may also avoid commenting on those with greater academic performance. To tackle this problem, there are methods that allow peers to assess one another without revealing their own identities (Wen et al., 2006). In summary, there are strong theoretical justifications for peer evaluation; however, there are not enough research evidence to support its effectiveness on student learning.

Hypothesis and Research Questions

Researchers in this field who have compared different types of group work. Some have compared different group sizes and others have compared online and face-to-face group works. Earlier studies have considered one factor at a time or have considered only one measure of success, therefore, the results of these studies are mixed and it is hard to conclude which type of group work leads to better results. For example, in most of those studies only a single dependent variable (student satisfaction, amount of collaboration, or students’ grade) has been evaluated. The goal of this study is to do a more comprehensive research in which several factors are investigated together (simultaneously) to find the interaction effects among those factors. It is hypothesized that there is a significant interaction among these factors and perhaps that is why the results of earlier studies on the aforementioned single factors are not quite conclusive.

Methodology

Four hundred and forty-seven students participated in this study. All participants were graduate students attending a public university in southern California who had taken at least one course with the researcher between 2013 and 2016. In each course, at least one type of group work or group discussion activity was used. Of these assignments, eight were conducted online (virtual environment) and the remainder (17 assignments) were done in a physical classroom. Some of these assignments were a simple collaboration on a quiz and some involved larger projects requiring students to do a research and to write an essay collaboratively. Some of the assignments required finding specific answers (convergent assignments), and others required exchanging ideas and summarizing the results of a group discussion (convergent assignments). Most assignments were graded by the instructor, however, some assignments were evaluated both by the instructor and the peer group, and just a few assignments were evaluated by peer group only. The evaluation of learning outcome or group performance involved either a rubric or some grading criteria assessing the quality and accuracy of the final product of the group work. Another dependent variable was the level and quality of collaboration (contribution to group
work) as measured by a given rubric (Appendix A). The third dependent variable was the level of students’ satisfaction with their group work experience. Student’s satisfaction was measured by a simple questionnaire given to students at the end of the assignment (Appendix B). Some groups had a chance to select their group members. These groups are considered homogenous since typically students of the same ability level tend to get together, of course with some exceptions. Other groups had to work in heterogeneous ability groups set up by the instructor. Finally, groups were different in terms of group size. Three group sizes were used for the purpose of data analysis in this study; small groups (pairs of students), medium groups (3-5 students), and large groups (more than 6 students).

**Results**

A summary of descriptive analysis of data is presented in Table 1. The six independent variables (mode of instruction, type of task, anonymity of participants, homogeneity of students in terms of their skill level, utilization of peer assessment, and group size) are listed in the first column and the averages of students’ scores on the three dependent variables (performance /outcome, satisfaction, collaboration) are presented in the last three columns. For convenience, all scores are converted to a 1-100 scale. Three independent variables (outcome, satisfaction, collaboration) are included in Table 1. The outcome/performance was measured by student score in a test/quiz or final projects. Student satisfaction and level of students’ collaboration were measured using the rubrics provided in Appendix A, and B. The first independent variable is the mode of instruction. For two-level independent variable t-test, and for more than two level variables analysis of variance was used to test the significance of any differences. The significance levels of p values for t-tests and analyses of variances are marked by asterisks in Table 1 and 2 indicating the difference is significant at $P < .05$. A quick review of this table shows that the learning outcome score and students’ satisfaction with group activity were higher in face-to-face courses rather than the online courses. However, the level or the amount of collaboration was higher in online courses.

The second independent variable presented in this table is the type of assignment. Comparing convergent and divergent tasks also showed that learning outcome score and students’ satisfaction with group activity were higher in convergent tasks rather than the divergent tasks. No significant difference was observed between convergent and divergent tasks in terms of students’ level of collaboration.

Anonymity is the third variable in this table. The table shows that the outcome quality of students’ group work was higher, and students collaborated more when they worked in groups anonymously. However, they were more satisfied and collaborated more in non-anonymous groups. Similarly, the table shows that students performed better and were more satisfied when they worked in homogeneous groups but the level of collaboration was higher when the groups were heterogeneous.

A univariate analysis of variance on the fifth independent variable showed that the outcome was highest when students’ performance was evaluated by the instructor, and the
Table 1. Mean scores for different types of group work.

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* Means the number is significantly higher than other numbers.

performance was rated lowest when student performance was evaluated only by their peer group. The performance quality (learning outcome) was somewhere in between when it was evaluated both by the instructor and the peer group. A similar pattern was observed with satisfaction as the dependent variable. However, as shown in Table 1, the level of collaboration was highest when student performance was evaluated both by the instructor and the peer group.

Finally, the last independent variable in Table 1 is the group size. The results showed that larger groups performed lower and their level of satisfaction and their level of collaboration was also lower than small groups. The level of collaboration was highest for the medium size groups.

In order to investigate possible interactions among these six factors, several factorial analysis of variance were performed. Six major interactions were found to be significant. The results of the factorial design analyses are presented in Table 2. The first significant interaction was found between the mode of group work (virtual, physical) and the type of
the task (convergent vs divergent). Virtual courses led to better outcomes and more students’ satisfaction when the assignment was divergent. However, in face-to-face group works, convergent tasks lead to better learning outcome and more collaboration among students.

The second significant interaction was found between the mode of group work (online vs face-to-face) and the homogeneity of group members. It was observed that in virtual environments heterogeneous groups performed better, were more satisfied, and collaborated more in comparison with homogeneous groups. However, in physical environments, homogeneous groups performed better than heterogeneous groups.

Mode of group work (virtual vs physical) and group size also showed a significant interaction. In virtual environment, larger groups performed better, were more satisfied, and collaborated more in comparison with small groups. However, in physical environments, smaller groups performed better and collaborated more than large groups.
Another significant interaction was found between the type of task (convergent vs divergent) and homogeneity of groups. On convergent tasks, homogeneous groups performed better and were more satisfied than heterogeneous groups. However, on divergent tasks, the heterogenous groups performed higher and were more satisfied than homogenous groups. No significant interaction was observed between these two variables in terms of students’ level of collaboration.

Finally, there was a significant interaction between the task type and group size. As shown in the last rows of Table 2, on convergent tasks, small groups performed higher and collaborated more than large groups. However, on divergent tasks, large groups performed better, were more satisfied, and collaborated more than did small groups.

**Discussion and Conclusions**

Six major factors including mode of instruction (face-to-face vs online), type of task (convergent vs divergent), anonymity of participants, homogeneity of students in terms of their skill level, peer assessment, and finally, group size were found to play significant roles in the effectiveness of group discussion. The most important conclusion of this study is the results revealed through the factorial analyses of variance. Several important interactions were found to be significant through this analysis. These findings have not been found or reported in earlier studies, particularly, in terms of considering all three measures of group work success together.

The findings of this study are valuable for teachers who want to start using group work in their courses. For many instructors who want to use group work in their courses there is no evidenced based research to help them how to form groups or teams in their classes and usually wonder what works and what doesn’t work. The overall results of this study indicate that the effectiveness of group work or group project depends on how the effectiveness is measured and how the group work is designed. Depending on how the effectiveness was measured, the results were quite different. Faculty can assign more complex, and more authentic tasks to groups of students than they could to individuals. Additionally, group assignments can be useful when the task is divergent in nature and requires multiple perspectives. A major advantage of group work for instructors is that they can save time through group work assignments by reducing the number of final products instructors have to grade and hence having more time on giving constructive and detailed feedback to students.

Instructors should assign only group work tasks that fulfill the course objectives and assign tasks that lend themselves well to collaboration. Instructors should also be aware that group project assignments can add more work for themselves and may introduce its own grading complexities.

For example, the results showed while face-to-face group work lead to a better learning outcome (final product) and it lead also to higher student satisfaction, online group work lead to more collaboration. This finding contrasts to earlier studies reporting face-to-face courses to be more productive in terms of collaboration among students. However, if we
consider the interaction with other factors, this contrast could be easily explained. As shown in Table 2, students perform better in face to face course only if the task is convergent. Another reason might be due to the fact the author required students to document their contribution to the group work in the online courses. This policy might have encouraged (forced) students to participate in all stages of group work. Conversely, this finding supports earlier studies claiming that students prefer face-to-face group work over online group work (Smith et al., 2011). Apparently, the logistical difficulties of working in groups are harder to resolve in online courses.

The second finding was that students performed better in convergent tasks in comparison with their performance in divergent tasks. However, if we consider the interaction with other factors, we’ll notice that this is true only if the course is fact-to-face. In virtual courses, students perform better in divergent tasks rather than convergent tasks. In face to face courses, students know each other. Therefore, if they work on a convergent task such as a science project, they can assign tasks to students who are the best in those tasks and as a result, the final project is going to be of high quality. On the other hand, in divergent tasks such as group discussions in social issues, the more the students know each other, the less there is a chance that they disagree on a social issue, and there is no real discussion or real exchange of ideas among homogenous groups. This is exactly the opposite in online courses. As mentioned earlier, in an online environment, students are much braver to challenge each other’s ideas and to defend their own viewpoints. Thus, in such environment there is a higher chance for a more meaningful and a more productive discussion and a higher quality final outcome. As another example, in face-to face courses, the author observed that when students were allowed to work on a quiz or on a problem-solving activity (a convergent task), they perform better than when they had to work in a research project (a divergent task). This is quite consistent with another finding in this study indicating homogenous groups performing better on convergent tasks and heterogenous groups performing better on divergent tasks.

Another important interaction was found between group size and the type of the task. Earlier studies had reported that smaller groups (2-4 students) perform better than larger groups (5-8 students). As expected, smaller groups performed better on convergent tasks particularly in physical courses. Larger groups performed better on divergent tasks, particularly, in online courses.

The results of this study suggest that teachers should not rely merely on research findings that have focused only on one factor at a time. For example, while many studies have suggested that small groups usually perform better than large groups, if the task is divergent and the goal is greater collaboration, then small groups may not be the best option. On the other hand, when teaching online, and the group is large, it is better to assign divergent tasks for group work. If teaching face-to-face and the goal is a higher quality final product, one should assign convergent tasks. It is suggested that if the goal is for all students to reach at a specific level of learning or to reach a specific level of achievement, then perhaps heterogeneous grouping is the best option, however, if the goal is to have students maximize their capacity as learners, homogenous grouping may work better. The results of this study indicate that the effectiveness of heterogeneous grouping depends on
the task (convergent, divergent) and also depends on the mode of instructions (i.e., online, in class). In online environments, high achievers will not become mentally lazy, and individuals from different cultural backgrounds and those who are not native English speakers, will get a chance to rephrase their statements and participate in group work with a higher confidence. The results of this study also support earlier studies finding students to prefer face-to-face group work over online group work. However, this study’s results show that students collaborate more and more equally in online group work, particularly, when the task is divergent and student’s participation is evaluated both by the instructor and peer group.

Most employers require graduates to be able to demonstrate competent teamwork skills and the ability to solve problems collaboratively. While teachers use group work to reach this goal, many teachers have reported that students simply use the opportunity to socialize rather than to collaborate. The results of this study would help teachers to set up their group work assignment in a way that maximizes the quality of final product or increases the level of collaboration or enhances students’ satisfaction with the group experience. Overall, as concluded in a report by the Carl Wieman Science Education Initiative (2010), although group work is sometimes hailed as an educational panacea, the realities are considerably more complex. Many studies of group work have been done and have shown a wide variety of results. In general, research in the area of group work has been oversimplified in many earlier studies. The results of this study reveal the complexity of the topic and suggests that educators need to consider at least six factors while they design group work assignments. This study is not a true experimental research and the conclusions should be considered cautiously. However, the findings clearly indicate that the success of group work depends on more than one simple factor such as group size or group homogeneity.

References


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**Appendix A. Rubrics to Measure the Level of Students’ Collaboration**

**Online Group Discussion**

1. Your input, measured by the number of words you post on discussion board.
2. The “frequency distribution” of your comments over time. Don’t post all or most of your comments at the same time.
3. Your knowledge, measured by the number of your references to the given list of readings and videos and other sources including any statistics you use to support your argument.
4. Your initiation, measured by the number of times you start a message that prompts others to reply or object (you get at least two replies).
5. The quality of your posting. Posting messages that contains a clearly stated conclusion or thesis supported by premises, reason, evidence, or your personal experience.
6. The number of your responses to other students’ posting.
7. The quality of the final reflection, and your conclusions.

**Class Group Discussion**

1. Taking the leading role or facilitating group discussion.
2. Teacher’s class observation of the level of participation of the student.
3. Peer group final ratings of individual students’ contribution to group discussion.
4. The amount and timeliness of student's participation in group discussion (not coming late or leaving early).
5. Rate the level of accuracy of this student's answers as evaluated by peer group.
Appendix B- Student Satisfaction with Group Work

1. Did you meet at a time that all convenient to all members?
2. We you able to spend enough time on solving the problem?
3. Were you given the opportunity to contribute?
4. Were all group members able to contribute something?
5. Did you work well as a group?
6. Did group members managed differences well to avoid conflict?
7. Were group members guarded or cautious in discussions?
8. Were group members reluctant to ask for or give help?
9. Was the group discussion dominated by a few members?
10. Were the final decisions made by only a few members?
11. Did you feel that rules set up by the instructor hindered your creativity and critical thinking in any ways?
12. Do you think your abilities, knowledge and experience were well utilized?
Mock Interviews in the Workplace:
Giving Interns the Skills They Need for Success

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Abstract

How many people have walked out of an interview wishing they could turn around for a re-do? Mock interviews can provide interns with demonstrations of the types of inquiries that can be expected in a real interview as well as practice in responding to those questions successfully. A simulation that occurs in a high-stakes atmosphere with the potential for real consequences is an even more beneficial practice round.

This study was conducted with secondary education pre-service teachers during their final semester as student teaching interns, and the mock interviews took place with administrators in their assigned schools. Results are based on anecdotal evidence and surveys that were offered after the mock interview activities were completed.

Keywords: Mock interview, hiring simulation, internship, mentoring.

The old adage “practice makes perfect” has been proven true throughout history by those who have run through countless military drills and music recitals, and it consumes the lives of today’s athletes and actors. Though relatively few people enter careers in which practice becomes a way of life, virtually everyone realizes its benefits. The theory of practice is so commonplace that most people either don’t consciously consider it or take their successes for granted. Even a simple wedding relies on its rehearsal. Why, then, does the start of one’s professional career, the realization of a life-changing goal at the outcome of The Interview, often occur without practice and result in a less-than-perfect performance? How many people have walked out of an interview wishing they could turn around for a re-do?

Most graduates have likely participated in or been assigned at least one role-playing activity during the span of their education, and these simulations can provide valuable learning experiences. Practicing for an interview, however, is less common. Many people

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are employed from the time they hold a driver’s license, and most rely on the confidence of those early successful interviews. What applicants may not consider is that an interview for a professional career is vastly different and has much higher stakes. “Learning from the real experience alone can be both painful and not particularly constructive. Learning through guidance, example and ‘dry runs’ can be more constructive” (Walker, 1993, p. 74).

The drawback is that these exercises, however well-meaning in their intent, cannot muster the same gut-wrenching levels of adrenaline and panic that an actual interview elicits. It is creating that feeling that needs rehearsing, preparing to be able to perform confidently and professionally despite the rising emotion and tremors. It is difficult to create a comparable level of intensity during a simulation when the setting is artificial and all parties know the situation is a fabrication that has low, if any, stakes.

A simulation that does occur in a high-stakes atmosphere with the potential for real consequences is a more beneficial practice round. This is the setting of the mock interviews that are the subject of this study. Workplace simulations give interns greater skills for success.

**Literature Review**

**Hiring Simulations**

Simulations are easy to construct and inexpensive. They remove the element of danger. They can even be “paused” when real life cannot. The enactments may so closely reflect actual events that there is little difference between the simulation and a real-world experience. They are hands-on and motivating for learners. They can be inspirational and empowering as the participants experience success (Cairns, 1995). Through observation, participants are able to reflect upon the event. Not without their limitations, they are worth their price in that they provide realistic training in a challenging moment that does not create a threat of failure.

Wells (1982), in his review of business and office education, asserts that good hiring simulations perform valid functions and provide hands-on experiences. Those experiences are the invaluable practice rounds. Questions and examples of how the interviewee might handle them are all fodder for a simulation exercise. Walpert-Gawron (2017) also asserts that predicting interview questions is one of the best precursors to a successful interview: “There tends to be repetition to the questions that all interviews ask, and the challenge can be in how to prepare a unique response that includes your expertise and personality. This takes preparation and thinking ahead.” Walpert-Gawron suggests that in addition to the expected questions about candidates’ strengths and weaknesses, questions that are embedded as reactions of what may be said or done when presented with a particular situation are becoming more commonplace. These scenarios may carry a heavier weight in the overall evaluation of prospective candidates.
Smith and Glover (2002) found success in combining simulations with writing assignments. They emphasize that college students have a practical approach to learning and, therefore, the simulation provides an exciting learning experience for them. This is affirmed by their study, which was conducted through active research. Their study was quite elaborate, focusing not just on the simulation experience, but both cognitive and affective objectives (Smith & Glover, 2002). The combination of these objectives paints a much richer, more complex, experience for students.

More recently, simulations have moved to virtual reality. Some educational institutions have implemented Mursion, an authentic learning program that uses avatars in a combination of artificial intelligence and live actors to deliver powerful and personalized simulations (Mursion, 2017). Using large-screen projections and two-way video, an office setting can be the virtual reality where professional candidates “practice and master the complex interpersonal skills necessary to be effective in high-stress professions” (Mursion, 2017). The sessions provide “immersive and authentic workplace environments in which to simulate challenging interpersonal exchanges,” including those that occur during interviews (Mursion, 2017). Conducted with a facilitator in communication with those behind the avatars, the simulation can be paused for discussion. This heightens the likelihood of using the experience for teachable moments and collaboration of ideas that can provide alternatives to missteps and suggestions for moving forward when candidates are at a loss.

Through hiring simulations, students learn about the process of obtaining employment, the tools they will need to participate successfully, how to read job announcements and descriptions, as well as how to write résumés, cover letters, and perhaps a guide for study and preparation before the interview. They learn to listen acutely as well as speak professionally. Students are also prompted how to act in a professional manner and communicate using professional language, and they are introduced to the professional environment in which interviews occur. Others in the business field have similar experiences with mock interviews (Marks & O’Connor, 2006; Newberry & Collins, 2012; Shea, 2007).

**Mock Interviews**

Mock interviews are a specific type of simulation structured to resemble real interview processes; they can be used as tools to help professional candidates equip themselves with the necessary confidence and training to successfully confront any real interview challenges. Mock interviews provide potential applicants with demonstrations of the types of inquiries that can be expected in a real interview as well as practice in responding to those questions successfully. Often, interviewers use examples from mock interviews to provide feedback that will help the interviewees improve their presentation skills and responses, and thereby increase the likelihood of obtaining a position of employment. The National Association of Colleges and Employers (NACE) supports the mock interview process. Students are advised to “take advantage of practice/mock interviews and interview workshops offered by your career center. Practice interviews will help you think through the answers to potential questions, polish your verbal communication
skills, and gain confidence that will show in the interview. They’ll give you a chance to get feedback and advice from professionals” (NACE, 2017).

In an overview of career transitions, Brooks (2010) discusses the “simulation job interview” and suggests ways to handle role-play within the interview. These include thinking ahead about situations that might occur in the desired position: What are the responsibilities of the position? Are there products, such as reports, that must be produced, and what might they look like? In addition to rehearsing the interview process, interns need practice defending their résumés and lack of experience. In order to stand out as the desired candidate, an intern must appear confident, assertive, and fully capable of fulfilling the responsibilities of the particular position. Many suggestions concerning how to “act” during a mock interview and how to prepare for one are most frequently found in business publications (Hansen, Oliphant, Oliphant, & Hansen, 2009; Holt, 2005; Shea, 2007). Brooks (2010) reminds participants to put on their “best self.” She suggests that they might seek to balance their talking with careful listening to the questions, seeking knowledge of the culture of the organization. Impressions are also important, and candidates learn the effects of body language, eye contact, and appropriate dress.

Faculty may also assign written responses to common interview questions or role-playing scenarios as class activities. Mock interviews help students develop oral communication skills, an ability that is all but neglected in the scope of one’s educational career. Most speaking skills are developed in the form of prepared presentations or discussion contributions and are informational in design rather than interrogative. When faculty assign mock interviews in a “‘question and answer’ setting, there is, in contrast, little opportunity for precise preparation and both thinking and verbal communication have to be more spontaneous and immediate” (Walker, 1993, p. 73). Most often, students participate in mock interviews during class either with a partner or a panel of peers (Hansen et al., 2009; Kernodle, Turner, & Everhart, 1999; Reddan, 2008). Although this may be a beneficial experience for students, this cooperative learning activity in a classroom setting may be taken less seriously and not have as great an impact as formal situations (Hansen et al., 2009; Lundelius & Poon, 1997; Newberry & Collins, 2012).

**Career Service Centers**

Many colleges and universities have career centers that offer mock interviews and hiring simulations for graduating students to practice their skills in a more formal setting. Hanover Research (2012) lists résumé critiques and mock interviews among standard practices and an increase in job placement rates when career services are utilized. However, NACE’s recent career services survey documents that the median number of dedicated interview rooms at doctoral Research 1 universities is six, and that number drops to zero for master’s and baccalaureate institutions where there are only one or two rooms that could be used for conducting interviews (NACE, 2016). It is therefore not possible for career service centers to invite all students to participate in a mock interview and practice their skills.
Career service centers have undergone a comprehensive transformation in recent years, including an online presence (NACE, 2016). Many career centers are transitioning their mock interview sessions to video platforms. InterviewStream Prep is an online application designed to help colleges and universities prepare students with mock video interviews “by creating a no-pressure environment to practice and develop their skills” (InterviewStream, 2016). Using a computer or mobile device, students can access open or assigned interviews that draw from a bank of questions, record their video responses, then either complete self-assessments or share their videos for feedback from peers or review by faculty and others (InterviewStream, 2016). Offering mock video interviewing to students is a solution to the lack of physical space and also enables every student to practice interviewing techniques.

Among other services career centers provide are access to online job portals, career fairs, and on-campus interview programs. However, both Hanover Research (2012) and the research of Reddan (2008) found that even when job search seminars and other services are provided for all students, these services are voluntary and the majority of students choose not to participate.

The Problem

Even after students do participate in mock interviews and hiring simulations, they don’t always feel interview-ready. Schaff and Randles (1972) found their students frustrated and nervous because no matter how much they practiced and discussed good interviewing tactics, it did not alleviate the fear the students felt when the real event presented itself. “Many students find such occasions intimidating and unfamiliar, unable to ‘do themselves justice,’ not because of a lack of intellectual ability but through their lack of experience with a demanding and highly pressurized situation” (Walker, 1993, p. 74). This remains a problem for today’s students. While mock interview and hiring simulation opportunities are helpful, the artificial environment of a campus conference room or classroom, obvious role-playing of campus personnel and avatars, and independently recorded video responses cannot instill the feelings caused by adrenaline and nerves that can be generated by a worksite setting during a simulation conducted by professionals in the field.

As a solution to the problem, this study was conducted with college students during their final internship semester, and the mock interviews took place with administrators in their assigned field experiences. Participants were not role-playing, unlike those who take part in traditional simulations. The settings were job-embedded, at their actual worksite locations – a high-stakes atmosphere with the potential for real consequences.

Participants

The participants in this study were secondary education pre-service teacher candidates during their student teaching internship. The pre-service teachers were within weeks of graduating and receiving their licensure and embarking on their search for employment; the administrators were those who had the responsibility of conducting interviews in their
schools, positions the graduating interns could fill. Thus, each mock interview had the potential for a high-stakes outcome.

Process

Preparation Prior to the Mock Interview

During the capstone seminar course of their student teaching internship, pre-service teachers were given the assignment of a mock interview. The assignment had three parts: constructing a professional résumé and application letter, arranging and participating in a mock interview at the assigned internship school, and reflecting on the experience.

In preparation for one of the seminar sessions, interns were asked to bring drafts of their qualifications and experiences they felt were important to include on a résumé. Class discussion focused on the elements, organization, and layout of that document, as well as the contents of the résumé’s accompanying letter of application and the appropriate format for that business letter. Later, draft copies of each were collected, then returned with suggestions for editing and improving the layout before the final copies were submitted for grading.

Scheduling the Mock Interview

Next, the interns were instructed to schedule mock interviews at the schools hosting their internship experiences. Students received the following instructions:

Arrange a time with your building principal or a team of teachers to conduct a mock job interview with you. Please ask your supervising teacher to help you set this up. You should provide your principal with a cover letter and résumé at least a day prior to the interview. As your mock interview comes to an end, you will have the opportunity for a conversation about the strengths and weaknesses of your interviewing skills and responses, as well as feedback on your cover letter and résumé format.

Each intern was responsible for arranging his or her own experience during a two-week window between the due date of the final résumé and cover letter and the end of the internship experience.

Appropriate interview behaviors were discussed in a large-group setting. These included the importance of dressing appropriately, arriving early, maintaining good posture and eye contact, using academic and professional language, and following the interview with a thank-you in a timely manner.

Follow-up After the Mock Interview

After the completion of the mock interview, the interns were asked to reflect on their experience in a short paper. The directions were as follows: summarize your experience in
regard to what you learned and how it will help you prepare for an actual interview in a
two-page paper. The purpose of the journal activity was for students to be able to carefully
consider the outcome(s) of the activity in a personal and meaningful way so it could
have a positive impact on their future performance during real interviews.

The interns were told that this series of assignments would do several things for them: it
would provide them with a professional résumé and letter of application and feedback; it
would provide them with an interview opportunity and feedback; and it would provide
administrators with an opportunity to learn about their skills and experiences, which
could have the potential to result in either an actual opportunity for employment or a let-
ter of recommendation for another opportunity.

After the mock interview assignment activities were completed, the interns were offered
both paper surveys and an opportunity to engage in a group discussion in order to provide
feedback about their experiences. These two methods were used to generate the data col-
glected for this study. Additional anecdotal information was contributed by an intern
whose results were not included in the data set.

Results and Conclusions

An Intern’s Perspective

During my teacher preparation coursework, I had the opportunity to experience a mock
interview conducted by the principal of the school where I was placed for my student
teaching internship. Reflecting on that interview, I realized how much it helped me pre-
pare for the real one.

The day of my mock interview was terrifying. As I walked into the office wearing a suit
and holding my résumé and transcripts, I was greeted by a receptionist who informed me
that the principal was at a meeting and requested that I wait. Although it was a mock in-
terview and I was well acquainted with the principal and school, everything felt unfami-
liar and strange. As I was waiting, I could hear footsteps and voices in the hallway; with
every step and voice that approached the door, my sense of nausea increased. To distract
myself, I started reviewing the résumé and transcripts I had brought. Between checking
the clock every thirty seconds, I asked myself mock questions and answered them in my
mind. I reviewed my notes as if preparing for the most important test of my life. Never
did I remind myself that it was only a mock interview with no possibility of future em-
ployment at that institution.

After what seemed hours, at the point of a miniature panic attack, I heard a pleasant voice
call my name. As I turned around, I found Ms. Adamson – the school’s principal – with
her hand extended. The moment I shook her hand, I realized how sweaty my palms had
become. I took a last look at the clock. I had waited for twelve minutes – and those
twelve long minutes had caused a turbulence of emotions. As we walked into her office,
Ms. Adamson started a conversation unrelated to our purpose. As we spoke, I completely
forgot about the mock interview and the trembling fear I had experienced in the waiting room. I began to relax and breathe.

At one point, Ms. Adamson started asking me questions about my college experience. She picked up my folder and looked through the documents. She asked me several questions, which included why I had selected biology with a pre-med concentration as opposed to an education concentration, what motivated me to transition to a career in education, what strengths and weaknesses I had discovered of myself during my student teaching, what challenging situations I had experienced during my student teaching and how I handled them, ways that I differentiate in a classroom, which situations would be appropriate to contact parents, and finally questions about classroom management. Ms. Adamson asked the questions in the same conversational tone as our previous casual topics, which helped me answer honestly and meticulously with ease and confidence. I made several references to my teaching experiences, limited though they were at that moment, and to my supporting documents.

Although the majority of the interview passed rather smoothly, Ms. Adamson’s last question caught me by surprise, reminding me of my earlier anxiety. She noted that I was not much older than the seniors and juniors at the school. Therefore, considering our close age and the various types of teacher-student scandals that had surfaced in recent years, how was I planning to maintain a professional boundary from the students? For a moment I could not think of a satisfactory answer, as I had neither anticipated that question nor rehearsed a proper response. I informed Ms. Adamson that I would always wear professional attire and maintain a professional attitude to distinguish myself from the students. Furthermore, I would refrain from sharing any excessive personal information with my students and conduct all types of communication with my students via the school email. Ms. Adamson seemed content, though to this day, I am not satisfied by my response. I was ill-prepared for that unexpected inquiry, and as a result, I said the first things that came to mind.

The mock interview provided me with insight to the types of information and documentation that potential employers might seek. It also helped me learn the level of detail to provide in addressing their inquiries. I even learned that relaxing during interviews helps candidates form more meticulous and well-constructed responses. Interviews, mock or real, are intimidating by nature; however, I have learned that it is vital to be both confident and comfortable while making those first impressions.

When the time came for my real interview, instead of being intimidated or nervous, I was confident and well prepared. I had anticipated almost all of the questions that my current employer would and did indeed ask me during the interview. Based on feedback acquired from my mock interview, I was able to provide my employers with “right” answers that not only seemed impressive to them but also assured them that I was indeed capable of fulfilling the responsibilities required by that employment position. In addition, I had taken relevant supporting documents with me to the interview and thus was able to provide my employers with any physical evidence they requested. My level of confidence and assertion during the interview, in addition to having ready answers and documentary evi-
idence, compensated for my lack of experience and strengthened my application for the position. As a result, I am now successfully employed as a classroom teacher.

**Survey Findings**

After the mock interview assignment activities were completed, the interns were offered paper surveys as a means to provide feedback about their experiences. The survey instrument was constructed using seven statements, each assigned Likert-rated multiple-choice response options that included Strongly Disagree (1), Disagree (2), Neutral (3), Agree (4), and Strongly Agree (5). Additionally, three open-ended perception prompts addressed participants’ attitudes toward future real-world interview opportunities, the value of the mock interview, and how to strengthen the effectiveness of future simulation exercises. Participants were told that participation in the survey was voluntary, with no penalty imposed on those choosing to decline. Of the pre-service teachers who arranged a mock interview at a school during the semester of their student teaching internship, 16 candidates elected to take part in the feedback process.

Completed survey data were analyzed for evidence of patterns resulting from the frequency of responses. The Likert ratings for 16 interns are summarized in Table 1, and the means are compared in Figure 1.

It is important to note that while the results show a range of Likert scale responses for each statement, the mean scores are all above 3 and thus in the positive range; most of them are in the range between 4 “agree” and 5 “strongly agree.”

The survey rankings were consistently lowest for the two statements about résumés and cover letters: the interviewer(s) did not appear familiar with these documents and the teacher candidates did not receive feedback to improve them. Though the teacher candidates were instructed to provide these documents to their interviewer(s) in advance of the mock interview, it is unknown whether the interns actually did so and/or whether the interviewer(s) took the time to review them in preparation for the simulation exercise. The amount and quality of feedback the candidates received in regard to these documents is dependent upon whether the interviewer(s) had and took advantage of the opportunity to review the documents. If feedback regarding these documents was not received, it could also be because it is not standard practice during actual interview situations; therefore, the interviewer(s) may not have realized this feedback would be helpful. It is also possible that during the debriefing sessions the candidates themselves were only focused on their interviewing skills and did not take advantage of the opportunity to ask about the presentation of their preceding paperwork. Though these statements had low rankings, they both fell in the range between 3 “neutral” and 4 “agree.”

The only other question that had a mean score ranking in the range between 3 and 4 was the statement, “The experience of the mock interview was about what I expected.” Unfortunately, this was not a useful statement because the survey did not provide for a means to determine whether the experience was better or worse than expected, just different.
Table 1. Intern Survey Results: Statement Rankings.

<table>
<thead>
<tr>
<th>Survey Statements</th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The interviewer(s) asked relevant questions pertaining to my content area.</td>
<td>16</td>
<td>1</td>
<td>5</td>
<td>4.06</td>
<td>1.289</td>
</tr>
<tr>
<td>2. The interviewer(s) seemed familiar with my résumé and asked about my experiences.</td>
<td>16</td>
<td>1</td>
<td>5</td>
<td>3.50</td>
<td>1.211</td>
</tr>
<tr>
<td>3. The experience of the mock interview was about what I expected.</td>
<td>16</td>
<td>2</td>
<td>5</td>
<td>3.69</td>
<td>0.946</td>
</tr>
<tr>
<td>4. I was able to receive important feedback about my résumé and/or cover letter from the interviewer(s) that I may not have gotten without this experience.</td>
<td>16</td>
<td>1</td>
<td>5</td>
<td>3.75</td>
<td>1.390</td>
</tr>
<tr>
<td>5. I was able to receive important feedback about my interviewing skills from the interviewer(s) that I may not have gotten without this experience.</td>
<td>16</td>
<td>1</td>
<td>5</td>
<td>4.56</td>
<td>1.031</td>
</tr>
<tr>
<td>6. Participating in the mock interview sets me at ease for future interviews.</td>
<td>16</td>
<td>2</td>
<td>5</td>
<td>4.25</td>
<td>0.931</td>
</tr>
<tr>
<td>7. Overall, I believe I have become a better interviewee after participating in the mock interview process.</td>
<td>16</td>
<td>2</td>
<td>5</td>
<td>4.63</td>
<td>0.806</td>
</tr>
</tbody>
</table>

The three highest-ranked responses were related to important qualities the interns were able to take away from the experience: feedback about interviewing skills, feelings of ease toward future interviewers, and becoming a better interviewee. Each statement had a mean rank in the range between 4 “agree” and 5 “strongly agree,” with the highest rating for the statement, “Overall, I believe I have become a better interviewee after participating in the mock interview process.” The scores for this statement also had the least deviation from the mean. This is an important and significant finding because it shows that the ultimate goal of the activity was attained.

The first open-ended survey question asked participants, “As you prepare for actual interviews in the future, what will you take from this experience?” Over one-third of the 14 respondents to this question noted that they will be better prepared to support their re
responses, from examples of their teaching practices, including work samples, to details about information found on their résumés. Two of the interviewees noted that they will be more aware of body language and the importance of making good first and last impressions. All of the respondents indicated that the experience was helpful and they took away useful tips and information.

The second open-ended survey question asked participants, “What aspect of the interview process was most valuable to you personally?” All 16 of the survey participants elected to respond to this question. The overwhelming response was the value of the debriefing session following the mock interview and the feedback that was provided to the candidates. Two-thirds of the interviewees commented that they received useful feedback regarding their responses, learned of the types of information that could be offered in an ideal response, and noted qualities that administrators look for in a successful applicant. These are valuable insights for interns as they move into the job market.

**Discussion Findings**

Immediately following the paper survey, the interns had an opportunity to engage in a whole-group discussion about their experiences. The discussion was led by a fellow intern. The discussion was planned using key points derived from the paper survey, and many students reiterated the responses they had written for the open-ended questions.
Several students voiced concern about their preparation for the university’s current process of the mock interview. Students collectively indicated that in order to prepare for a real interview, they were advised to gather more information from their field experiences since most administrators appeared more interested in their classroom experience. Many students additionally expressed that they wished they had shared more information about classroom management and had made references to the troublesome situations that they had resolved in the classroom. A key point that the majority of participants emphasized was the importance of being confident and assertive, especially while handling unmotivated or challenging students.

Students also voiced concern about the questions that they had failed to answer. Rarely were applicants asked content-related questions, and those who were asked rarely responded incorrectly. Most of the participants could not satisfactorily answer questions relevant to professional development. Several of the school administrators inquired about candidates’ growth or experience in the area of professional development and collaboration within departments. Not many interns had the opportunity to attend professional development meetings. For instance, one candidate reported that the professional development meetings were held before school and appeared to be exclusive to the faculty. In addition, the departmental meetings were also exclusive to the faculty. Therefore, she did not get an opportunity to attend either of the meetings.

Fortunately, most of the candidates stated that their interviewers had reviewed their résumé, application letter, and content knowledge prior to their interviews. Nearly all the candidates were asked questions pertinent to the content displayed on their résumé and letter. However, none of the candidates were asked many questions related to their area of specialization.

Through all the hurdles and surprises, several aspects of the mock interview process were valuable to the candidates. Unexpected questions during the mock interview taught applicants to avoid panicking and answer to the best of their ability with a tranquil demeanor. All of the candidates agreed that the mock interview process helped them build confidence in their interviewing skills as well as taught them to defend their internship experience in detail and display a “Go-get-'em” attitude. In addition to feeling comfortable and confident during an interview, the mock interviews taught the candidates to mention specific classroom examples and have physical evidence to help make a good first and lasting impression. The mock interview process also provided candidates with a sample set of questions, which would become useful while practicing for a real interview. These key benefits should be noted by future applicants while preparing for their anticipated professional careers.

**Implications for Future Research**

The survey rankings were consistently lowest for the two questions about résumés and application letters: interns reported that the interviewer(s) did not appear familiar with these documents and the teacher candidates did not receive feedback to improve them. In the future, it will be important for faculty to stress the added value for the candidates to
receive feedback on their written work, whether these submissions are electronic or printed, as this review is when the decision is made whether or not to schedule a face-to-face interview. The interns will be given reminders to provide the résumé and its accompanying letter of application in advance of the interview and to follow-up with specific questions focused on ways to improve each of them during the debriefing conversation. In support of this recommendation, the third open-ended survey question, asking what could be done differently to make the process more meaningful, prompted one intern to write that s/he “would have asked for feedback on résumé and cover letter.”

Although nine participants responded to the third open-ended question about ways to improve the experience, the improvements were of a personal nature; none of the suggestions related to the process itself. However, several of the participants offered suggestions to help improve the mock interview process during the whole-group discussion. One of the most important suggestions was to instruct future applicants to complete their résumés and cover letters before beginning their internship courses. In addition, it will be helpful if future interns can experience two mock interviews – one at the beginning of the internship and the one at the end. The differences in performance in the two interviews over a course of student teaching will allow applicants to monitor their progress in their interviewing skills. Experiencing a mock interview earlier in the semester will help to develop skills for a real interview, which several of the applicants underwent toward the end of their student teaching.

The interns in this study were within weeks of graduating and receiving their licensure and embarking on their search for employment, and the administrators were those who had the responsibility of conducting interviews in their schools, potentially for positions the interns could fill. Thus, each mock interview had the potential for a high-stakes outcome. However, no data were gathered to determine whether any of the mock interviews resulted in either an actual opportunity for employment or a letter of recommendation for another opportunity. Future surveys should include a question to elicit this information in order to strengthen the results of this mock interview process.

For today’s graduates, online applications are the norm, and many employers are seeking electronic means to narrow their interview pool. Video conferencing through online platforms is now the most common method of conducting first-rounds of interviews. This cost-saving trend has been on a steady incline over the past decade, with the most significant growth recently reported in 2016; over 55 percent of employers reported using video interviewing as a college recruiting tool (NACE, 2016). Video job interviews have their own set of additional caveats, from background staging and lighting to a different type of eye contact and reliable technology. For this reason, the inclusion of a video component will be important for future studies about the effects of mock interviewing for interns.

**Applications Beyond the Scope of this Study**

Effective teaching makes a lasting impression and instills value in learning and the resulting application of one’s education. It is not enough for faculty to simply provide requisite coursework and grades. “In the wake of the 2008 financial crisis and the ever-rising cost
of college, students expect higher education to help launch their careers, not just make them smarter” (Young, 2016, p. B4). Students appreciate course assignments that have practical application to their career fields, and requiring students to participate in a mock interview during their final semester sets them on an immediate path to finding employment following their graduation. The ceremony itself is called a commencement because students are beginning their new lives on their chosen career path. Faculty members who strive to provide authentic learning experiences for their students will guide them toward a path that leads beyond the scope of a college course.

Overall, the assignment to have students participate in a mock interview in the workplace has proven to be a valuable tool to help interns successfully prepare for a real interview. Although this study was conducted with education majors, it can easily be replicated for use with interning business majors, those preparing for a medical profession, and those enrolled in any other degree program that places students in a field experience.

In addition to providing benefits to students, field-based mock interviews also help prospective employers increase their number of credible candidates. Career service centers and/or advising centers can emphasize this rationale to create partnerships with local businesses and professional organizations for the purpose of conducting mock interviews on site for students who do not have a field-based internship as part of their academic program. For students who wish to pursue a higher degree instead of entering the workforce upon graduation, mock interviews with academic leaders in the dean’s office can help students learn skills to promote themselves for graduate studies.

A productive mock interview can be conducted in as little as twenty minutes and can yield amazing feedback for both the candidate and the interviewer. With such a low investment cost but high profit margin, mock interviews in the workplace offer foolproof success.

**References**


Enabling Context-based Learning with KPortal Webspace Technology

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Abstract

Recognizing the importance of context-based learning and the general lack of technology applications in the design and development of the ideal and formal curricula, this paper describes an experimental system at a large public university. The authors describe the creation of a contextual environment for introducing concepts related to information security to undergraduate business students using the KPortal (Knowledge Portals) webspace technology that supports dynamic content gathered from various sources automatically. The KPortal webspace rated highly on the various attributes of effective contexts and the characteristics of technologies that enable context-based learning. The flexibility provided by the webspace permitted the authors to develop adaptable environments in which the students could connect well with rather abstract concepts. The overall intervention was designed to examine if a limited portion of the course could be supported by technology and next phases of the research will broaden its use to semester-length curriculum.

Keywords: Context-based learning, KPortal, webspace.

The last decade has seen a tremendous interest across college campuses on a teaching method broadly termed as “active learning” or “flipped learning (or flipped classrooms)” (Faust & Paulson, 1998). The term “active learning” is often used to explain varied classroom experiences which are more than straight lecture and listening but engage learners in the analysis, synthesis, and evaluation of material (Ishiyama, 2010). The benefits cited are that students learn and retain knowledge more and develop higher levels skills such as creativity, teamwork, and collaborative skills. Active engagement and learning are often considered to be the most significant predictors of student success and retention.

The recognition of active learning as beneficial to student success has prompted significant research to understand the techniques to engage students, class room layout, and technologies to support student engagement (e.g., Bonwell & Eison, 1991; Yaron & Ruth, 2015). Active learning techniques are quite varied and range from simulations to

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case studies with an emphasis on the role of the faculty member in the design of experiences which engage students both in and out of the class room.

Active learning has its theoretical roots in Context Based Learning (CBL) which has been used extensively to develop curriculum in chemistry, physics, and the general science (Hunter, 2015). This approach is best exemplified by the Salters’ approach in the field of chemistry (Campbell, Lazonby, Nicholson, Ramsden, & Waddington, 1994). What is unique to this approach is the creation of a real-life or fictitious environment to enable learning. The “context” can also be created by field visits and any activity which forces the learner to use class room concepts within the real-life contexts.

This paper reports on our experiment to create a contextual environment using a webspace called Knowledge Portals (KPortals) where we aggregate news links, Twitter feeds, and varied social media content and connected this material to a mobile app so that the learning experience is embedded, continuous and ongoing. We further use KPortals to build various active learning exercises so that students in undergraduate and graduate business classes are able to explore a diversity of topics. We report below the process which we used and efforts which resulted in creating these activities with the hope that broader and longer duration experiments will reveal if the use of such technologies does produce the benefits theorized from CBL.

**Context-based Learning**

The use of “contexts” to create curriculum and bring the teaching of course material closer to students by linking key concepts to their environment (personal, societal, and work) has influenced education research in the sciences since the 1900s. Gilbert (2006) provides a detailed background and explanation of models, attributes, criteria, and usefulness of contexts in education. While this explanation is specifically related to chemistry education, the principles are applicable more generally. As he notes, the origin of the word is from the Latin language “contextere” or “weave together” and is used generally to describe “circumstances which give meaning to words, phrases, and sentences” (p. 960). Thus, a context is the external environment which places the concept under study within a broader perspective. In so doing, the student first connects with a specific experience, problem, issues, or circumstance which either he/she is familiar or can relate easily to before being led into an inquiry-based examination of specific concepts meaningful to that context. This is very different from a teaching philosophy of learning a series of concepts with possible application of some in a hypothetical example or through an explanation provided by a faculty member from their life experiences.

As noted by Pilot and Bulte (2006a), the approach has resulted in the development of curriculum such as Chemistry in Context in the United States, Salters Advanced Chemistry in the United Kingdom, Industrial Chemistry in Israel, Chemie im Kontext in Germany, and a Context-based Approach in the Netherlands. Within the field of chemistry education, each of the above approaches has been shown to be quite beneficial to students, well accepted by faculty, and promoted by government policy as “relevant education.” What is common to each of the above approaches is that they connect well-researched curriculum
concepts to a broader context. The context is chosen and prepared so that it is meaningful to the student, thereby, giving each concept a visible connectedness which facilitates both teaching and learning.

**Contexts in Curriculum Design and Development**

Pilot and Bulte (2006b) anchor context-based learning in the curriculum models of Goodland (1979) and Van den Akker (1998) using the concepts of the *ideal curriculum* (the original vision), the *formal curriculum* (the elaboration of the original vision), the *perceived curriculum* (how teachers understand it), the *operational curriculum* (how the curriculum is presented in the class), the *experienced curriculum* (the actual learning processes), and the *attained curriculum* (the learning outcomes achieved).

The *ideal curriculum* delineates how the study of concepts will be associated with one or multiple contexts. An example is provided in the details of the chemistry curriculum developed in Israel (Hofstein & Kesner, 2006) where the primary context of the education is based on industrial chemistry in Israel, its importance to the Israeli society, the technological, economic, and environmental factors of the chemical industry, specific problems and the dynamic nature of the chemical industry. The *formal curriculum* sets out details of the contexts and the details of each element of the curriculum. Continuing with the Israeli example, two case studies were specifically constructed to teach chemistry concepts. In addition, the development of case studies reflected broader issues of how the chemical industry had changed in Israel through regulation, competition, and advances in science which enveloped chemistry education in socio-technical and cultural components of Israeli society. In order to help the *perceived curriculum*, educators must be familiar with the context developed. In the above example, teachers would have to know the nature and details of the chemical industry in Israel so that they could develop a narrative in the classroom to connect the environment to chemistry concepts. The developers of the curriculum assisted in the transfer of knowledge by creating small group sessions and workshops to bring the right background information to them.

The *operational curriculum* is the process of implementing what the teachers perceive and in the example above was facilitated by lab exercises, case study questions, mini-projects, and classroom debates. The intent was to use specific narratives to reveal and discuss key chemistry concepts even as the broader discussion of the Israeli chemical industry takes place. Finally, the *experienced* and *attained* curriculum is the process of assessment—both formative and summative with a goal to understand if the formal curriculum was operationalized correctly. The context of the curriculum is not as important in these phases. Rather, the emphasis is on the learning, effectiveness, and attainment of knowledge which can be transferred to different problem sets.

Duranti and Goodwin (1992) propose educational contexts to have four attributes (p. 6/8) for effective learning:

(a) **Setting**: A setting, a social, spatial, and temporal framework within which mental encounters with focal events are situated;
(b) **Environment:** A behavioral environment of the encounters, as the way that the task(s) are related to the focal event;
(c) **Language:** The use of specific language, as the talk associated with the focal event that takes place; and
(d) **Relationship:** A relationship to extra-situational background knowledge.

The “focal event” referred to above is the discourse which takes place within the context – it is the event that gets attention and from which relevant discussion of concepts ensues.

Context-based learning approaches help address several challenges in the design and development of curriculum (Pilot & Bulte, 2006a) such as curriculum overload, isolated facts, transfer, relevance, and emphasis.

(a) **Curriculum Overload:** Contexts are considered useful because of their ability to identify classroom content using the “need-to-know” principle. Rather than approach curriculum as exhaustive, a context-based approach would apply a selection criterion based on the environment (context) and help to bring only those concepts to the classroom applicable to the selected contexts. In so doing, the emphasis shifts from teaching the entire curriculum to teaching the “relevant” curriculum and avoiding overload.

(b) **Isolated Facts:** Another challenge is attributed to the curriculum being treated as a collection of isolated facts, which risks students not knowing how these fit together. By developing contexts, the curriculum resembles a spider web—in which the concepts are connected in a visual form—which can help students to develop a mental schema of the course material. The designers of existing context-based courses focus on how one spider-web leads to the next and using this analogy, various higher level concepts are introduced to the student.

(c) **Lack of transfer:** Students can be encouraged to see the concept as a way to understand many different phenomena or solve not just the problem given to them but other problems as well. This transfer of knowledge is known to happen explicitly in context-based curriculum development.

(d) **Lack of relevance:** Developing a relevance to education could be the strongest contribution of context-based learning. Contexts explicitly develop an environment to which students can connect and then explains concepts related to that environment. This is not the same as chapters in a book which exhaustively detail each concept. Instead, the context is the primary mode of bringing a learning experience to students.

(e) **Inadequate emphasis:** Many courses taught today are thought to bring a “solid foundation” to education—the emphasis is on pedagogical completeness and not on usefulness or relevance to the student. The Industrial Chemistry in Israel emphasizes the technological, environment, economic, societal, and political issues to which the study of chemistry is relevant. The emphasis on practice in this particular case was deliberately chosen to broaden the aims of a specific educational experience by bringing a balanced emphasis to it.
Technology-enabled Context-based Learning Framework

Recognizing the importance of context-based learning in higher education, it useful to explore how technology might be able to best support it. A preliminary framework is proposed below.

The development of the framework begins with recognizing different phases of curriculum development with the context-based approach, salient process associated with each phase, and the technologies which could support each phase. See Table 1 for an overview.

Table 1. Technology Support in Curriculum Development Phases.

<table>
<thead>
<tr>
<th>Curriculum Phase</th>
<th>Salient Processes</th>
<th>Technology Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ideal Curriculum</td>
<td>Develop the original vision, basic philosophy, rationale and underlying mission, and also a model of context use</td>
<td>n/a</td>
</tr>
<tr>
<td>Formal Curriculum</td>
<td>Elaborate on the curriculum and design context(s)</td>
<td>n/a</td>
</tr>
<tr>
<td>Perceived Curriculum</td>
<td>Determine how teachers understand and plan to use the curriculum</td>
<td>n/a</td>
</tr>
<tr>
<td>Operational Curriculum</td>
<td>Develop the nature and content of the interactions between teachers, students and resource material</td>
<td>LMS, online content and information sharing systems</td>
</tr>
<tr>
<td>Experienced Curriculum</td>
<td>Articulate the actual learning processes undertaken by the students</td>
<td>LMS, online systems such as Facebook, blogs, wikis</td>
</tr>
<tr>
<td>Attained Curriculum</td>
<td>The learning outcomes achieved by the students</td>
<td>LMS, online systems such as Qualtrics</td>
</tr>
</tbody>
</table>

The primary task in developing the ideal curriculum is an agreement on what type of context is relevant to the curriculum. Secondary tasks involve the relationship of the selected context(s) to specific concepts around which learning should concentrate. Contexts have sometimes been based on a broad view of society and the environment and implemented either generally while describing issues such as “global warming” or detailed case studies. There has been no reference to any use of technology while creating contexts. Similar observations can be made for the formal curriculum in which details of context attributes are established and the focus is on the “use of contexts.” It is also possible that the primary context line could be spliced into focused illustrations or sub-contexts to allow manageable segments of study to emerge. The research is limited in how technology can support this phase of curriculum development. Perceived curriculum
is a personal experience of a teacher interpreting the ideal curriculum based on his/her beliefs, attributes, and experiences. The scope of the use of technology during this phase has been rather limited as well.

A teacher’s interpretation of curriculum is transformed into narratives (lectures, discussions, questions, labs, exercises) as part of the operational curriculum development. If the context(s) is chosen with care, the development of narratives can more effective. Generally, teaching support material such as study guides are the tools chosen by faculty as support tools and may include web sites established by the curriculum developers and/or publishers. Examples of technology in this phase are learning management systems (LMS) and information sharing sites of textbook or content publishers. Currently, the experienced curriculum and attained curriculum phases seem to enjoy technology support to a greater degree than other phases. LMS excel at the distribution of syllabi, slide decks, reading materials, discussion threads, and provide consistent support to students. To some extent, such capabilities are also available through disparate systems such as Facebook, blogs and wikis. The formalization of quizzes, tests, and assessment material to measure the success of the attained syllabus are core strengths of LMS and well developed with such systems.

The above analysis suggests that based on activities which comprise the different phases of curriculum development, there are only limited opportunities at the operational, experienced, and attained curriculum phases. Sharing of information amongst faculty, restricted web sites developed by publishers, faculty teaching material and its sharing could be the only support needed in these phases. However, the development of contexts at the ideal, formal, and perceived curriculum phases does represent an interesting possibility for technology use. The paper proposes that any technology application which can support context development at the initial phases of curriculum development should enable the following characteristics of contexts:

(a) **Malleability**: Following the logic presented by Whalley (1993), contexts need to be malleable, i.e., they should have the capability of changing over time and the capability to offer multiple perspectives on a particular domain. It should be possible to use the application to present and then represent ideas in ways which are difficult to achieve in print (p. 12).

(b) **Cognition**: Context-based education strives to embed learning in realistic and relevant settings, and cognition is at the core of such an experience, i.e., the choice of the environment determines what is taught and how it is taught (e.g., Brown, Collins, & Duguid, 1989). A technology application should be able to develop a cognitive context that provides stimuli for sense-making.

(c) **Dialog**: Contexts need discussion and a social dialog which allows their meanings to emerge, referred to as the zone of proximal development (Vygotsky 1978). Rather than the teacher bringing concepts to class, the contexts facilitate a flexible narrative which naturally allows concepts to emerge and be clarified; hence, the notion of student ownership and a joint learning process.

(d) **Mutimodal**: To bring a context to life, it must be more than logocentric (Cunningham, Duffy, & Knuth, et al. 1993). As noted by Cunningham et al. (1993), “It
is all too easy to fall into the trap of endless talk about issues and little consideration of all alternative representation” (p. 27). Consistent with the ideas presented by Gardner (1983), contexts must take advantage of multimodal representation of information.

(e) Reflexivity: A uniqueness of contexts is that they can encourage reflexivity in the classroom, which encourages self-awareness and an examination of the individual’s own internal processes, beliefs, and thinking (Thomas & Thomas 1928).

Case Study:
KPORotal Webspace Technology for Information Security Context

Two authors of the current study teach an undergraduate course in management information systems (MIS); a course which shares several characteristics of context-based courses in chemistry and the general sciences. Like chemistry courses reviewed previously, it is an introductory class for business majors (mostly juniors) with few students with any intention of being in the information systems field or MIS majors. While all students may interact with technology concepts over their careers; most are not enamored with details of hardware, software, programing, information systems architecture, telecommunications, large systems or information security. It is also, perhaps, one of the last opportunities to introduce the students to the power of technology to change society, organizations, and lives.

As in most such classes, there is an exhaustive ideal and formal curriculum which describes detailed concepts to ensure that all parts of information systems design, development, use, and implementation are discussed in class. Both authors realized that this particular area of education faces challenges of overload; isolated facts; lack of transfer, lack of relevance, and inadequate emphasis. Technology changes rapidly and places a pressure on textbooks to add/update content; much of it is included in new additions without as much attention to how it fits into a broader perspective technology relevance to students. Textbooks sometimes deal with overload and new concepts by moving extensive details to appendices without much forethought.

The authors proposed that to address some of the challenges of teaching this course, they would adopt a specific context but only for a small portion of the course as an experiment to examine the broader applicability of this approach. A rather difficult portion of the course describes issues of information security and ethics, with each concept described in hardware and software terms. In assessing this specific area, the authors also realized that the area could be connected in a spider web to interesting ideas beyond the field of information security. An initial draw-out of this spider-web is shown in Figure 1 and is modeled on Schwartz (2006).

To operationalize a context in information security\(^2\), we looked for ways that the topic could be taught within a natural environment such that the spider-web of Figure 1 could

\(^2\) “Information security” and “cybersecurity” are used synonymously since much the news media does so and to include news items which could be captured by the term “cyber” rather than “information”.

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emerge naturally and begin to excite and engage the students. After a review of various technology tools, an educational version of a unique webspace called KPortals was licensed from a commercial company for use in the MIS class. A complimentary educational license permitted the use of a KPortal webspace called Cyberbriefs (www.cyberbriefs.org) to be custom designed for the course and allowed the dynamic aggregation of content from various sources such as news, social media, video, books, and articles, quite unlike the typical LMS. A view of the website is provided in the Appendix. The webspace is accompanied by a mobile app to push content to the students.

The structure of the webspace is as follows:

- **Main Story**: Any news item/announcement which the faculty deemed to be highlighted.
News Links: News links of interest to the course. For the class project, these links were selected by two authors from everyday news. Frequent updates were made during days of interesting news in the field; sometimes as often as 15 minutes.

Twitter feeds: Keywords specified to pull twitter feeds included cyber security, cybersecurity, cyber defense, cyber war, data breach, and cyber-attack. Included with the webspace is a sentiment analysis tool which classified each tweet into positive, negative, and neutral sentiments. Finally, an index value shows the general sentiments across tweets of the public-at-large.

YouTube videos: Using a background keyword search, the webspace pulled in latest videos posted on YouTube related to the keywords above.

Amazon books: Keywords as provided also retrieve recent books on those topics available at Amazon.com

An extensive list of blogs, websites, and magazines is available in the webspace.

A daily account of number of visitors is displayed on the web site along with the number-of times a particular link was accessed.

Finally, students subscribe to a daily newsletter on the main news items in the field of cybersecurity.

As can be seen from the Appendix, the webspace places a student squarely in the middle of current events in the field of cybersecurity, including latest news culled by faculty, updated twitter feeds on cybersecurity, latest video updates and books. There are opportunities to explore related sites and information links; the webspace helps the students to acquire a better understanding of the environment around them.

For the ideal curriculum, the webspace serves to create a context “which enhances students’ appreciation of how information security serves to keep us safe and lead somewhat private lives by helping us understand our digital environment and its risks.” Detailing the above context led to development of a formal curriculum based on several narratives which emerged naturally from the webspace. For the perceived curriculum, the webspace enables the faculty to learn and determine the background scope relevant for the context. Some examples are described below.

Example #1: The webspace continuously displays a cybersecurity risk index which changes monthly. What is the status of the risk index? – is an effective cue to a discussion related to perceived risks by cyber experts. Relating the index to news items, tweets and sentiment index is an exercise which can happen every day.

Example #2: The webspace also displays a cybersecurity portfolio which displays in real time an index of stock prices of cybersecurity firms (delayed 15 minutes). Since all students in the class are business majors, interpreting stock prices and returns is a natural environment for them. However, in this case, a discussion often begins with “Why is the index where it is today relative to yesterday? Last week? Last month?” Often, the answers are difficult but relating them to the content of the news items is informative and perhaps more informative is looking at the stock prices which make up the portfolio and displayed in the
screen in different categories. Understanding individuals' stock and outlooks is generally very helpful in interpreting the portfolio.

- **Example #3:** Because the news items in the workspace are current, it is easy to begin a discussion with “What is the main story today (this week)?” and why is it important? Taking a longer term horizon (a week) is sometimes better because the students now have to make a choice of selecting among multiple main stories (which change every twice a day minimally). During one week of the Fall 2016 semester, news links were dominated by the hacking of the DNC (Democratic National Convention)\(^3\). Interestingly, some undergraduate students were unaware of this event but soon realized the extent to which cybersecurity was dominating national news.

- **Example #4:** Following up on the previous example, student groups are assigned to “Determine the top five/six cyber events over the last 12 months.” The archives of the workspace are replete with examples and a quick search reveals a rather dominant list. Interestingly, some students opt to search externally and generally take longer because within cyberbriefs.org, incidents are flagged to provide cues of major events.

The examples above underline to the flexibility to create narratives and the variety of possible directions based on the selected context enabled by a technology application. Examples #1 and #2 may be viewed as interpretive applications in that there is not a single correct answer and the discussion can emerge. Examples #3 and #4 may be considered as deterministic applications in that there is generally a correct answer that may be identified through the learning process.

**Discussion**

In assessing the extent to which the Cyberbriefs workspace exhibited the characteristics for effective curriculum development, the following are noticeable.

(a) **Malleability:** The capability of change over time is embedded into the workspace. Since the site collects news links of events, twitter feeds, videos, and recently released books; there is little risk of the cyber context appearing dated. The site engine provides suggested news items which are sent to the faculty, who can then select and post relevant ones to the workspace.

(b) **Cognition:** Information security and cyber concepts tend to be highly technical. While most faculty may recognize their importance, most undergraduate students do not appear to grasp its relevance. By changing the nature of the discussion to everyday events which affect their lives, this context embeds learning in realistic and relevant settings. During the Fall 2016 semester, there was a day of massive internet outage in the United States\(^4\) because of a DDoS (Distributed Denial of Service) attack at Dyn. There was a personal recognition of this event by several

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\(^3\) Here’s What We Know About Russia and the DNC Hack, [https://www.wired.com/2016/07/heres-know-russia-dnc-hack/](https://www.wired.com/2016/07/heres-know-russia-dnc-hack/)

\(^4\) What We Know About Friday’s Massive East Coast Internet Outage, [https://www.wired.com/2016/10/internet-outage-ddos-dns-dyn/](https://www.wired.com/2016/10/internet-outage-ddos-dns-dyn/)
students because of disruption to their work and intermittency of internet connections. The event served to change perceptions of rather difficult concepts by making them immediately personal.

(c) Dialog: Cyberbriefs.org contexts allow intense discussions and narratives encourage social dialog. Following the example above, a narrative was created to brainstorm business losses and impacts as a consequence of the outage; the motives of the perpetrators, and actions which organizations could take related to business continuity. Referring to the nomological spider-web, it was quite effective in exploring several strands such as data backup strategies, disaster recovery plans, and failsafe strategies (See shaded areas in Figure 2 on the various concepts which were discussed).

(d) Mutimodal: Research conducted at PEW Research (Purcell et al., 2012) identified relevant modalities of representing information for undergraduate students as texts, video, and tools such as Google, YouTube, Twitter, and similar tools. By providing access to these tools, the webspace encourages students to assemble information from different information representations.

(e) Reflexivity: As noted previously, reflexivity encourages self-awareness and an examination of the individual’s own internal processes, beliefs, and thinking. Using the context created through cyberbriefs.org and the example above, a narrative created for the class was “What is your personal data recovery strategy; how do you personally protect your work – at work, at schools?” Numerous times in the semester, such individual questions were posed so that students could understand their own beliefs, behaviors and attitudes.

In assessing the extent to which the Cyberbriefs webspace demonstrated the attributes of an effective context, the following can be discerned. In an introductory course in MIS, the desire was to teach information security (the focal event). The “setting” was a cyberattack which occurred recently, the havoc that this event caused, and the discussion of the possible motivation(s) of the perpetrator of the attack. The “environment” was the type of attack vector used in the attack, the methods of gaining access to computer systems and the attack footprint; as well as most likely attack paths in the event. The “language” relates to the technical language associated with the focal event, the need for cyber security, and the use of specific resistive methods which could stop such events. The “relationship” outlined the background and history of cyber events and the need for cyber vigilance culminating in a fuller articulation of cybersecurity concepts. Informal comments provided by students indicated that the webspace enabled them to gain an overall understanding of information security, the need for proactive monitoring, and the extent to which it impacts society. The two authors who adopted the webspace technology in their courses, upon reflection, determined that the context allowed the emergent themes of various inter-related aspects of the focal context that they had not been able to achieve in previous offerings of the course that did not employ the webspace technology but followed a typical textbook-driven topic-based class sessions. The emergent themes

5 In our specific class, we used the example of WikiLeaks hacking the DNC during October, 2016.
6 The specific example was created by the authors during the Fall, 2016, term for use in four classes of undergraduate students and replaced a traditional lecture of cybersecurity concepts taught as linear concepts such as “What is a firewall?” and “How does DDoS attack work?”.
Figure 2. Emergent Concepts on Information Security in Dialog.

were driven jointly by both the faculty members and the students since the webspace technology provided new information, the discussion for which could not be planned for ahead of time.

The cybersecurity.org webspace shows promise as a general tool to create a context-based curriculum. The social, spatial, and temporal framework it placed before the students allowed a uniqueness to the educational experience. The webspace helps identify the focal events in multiple ways—graphically, using hyperlinks, analyzing tweet data, and building an environment from which students can explore the broad nature of the field. Previous examples of curriculum rely mostly on fixed state or static contexts, which, once written, inform the teaching of that specific curriculum for a period of time. In our study, the context is dynamic, i.e., the webspace is populated with news items and other content constantly. The dynamic nature of the content is quite powerful in addressing behaviors related to a chosen event. A simple game of team reading among students, for example, can identify actions taken to reduce threats. Actions will often be classified
into people, processes, and technology and will encompass several strands of the spiderweb in Figure 1. Some of the language needed in using the webspace is fixed in that it seeks to explain presented information such as risk index levels. Other language is flexible based on student comments and discussions. Always having a starting point to begin the conversation was found to be quite useful for class purposes. Finally, the manner of easing a class from the environment to a group of concepts appeared seamless for our classes. Using the context as a frame of references also allows for an automatic selection of an “interesting hook” to begin a class discussion. The evolving nature of the cybersecurity environment and daily events provide the interesting hooks immediately.

Based on our experience with the webspace technology, it is possible to offer some guidelines and best practices for others who may strive to adopt similar strategies in class.

a) Developing an acceptance of transitional context and concept: There is a fundamental difference in the context-based experience due to the directionality of the “concept” and its “context.” Traditionally, a set of concepts is posited in a curriculum and presented as theory that can scaffold to knowledge. The scaffolding often requires an illustrative anchor and thus the notion of “how is this used in practice” drives examples and case studies. A reversal of this tradition becomes obvious in the transition between context and concept when using a formal context-based approach. A familiarity with a context comes first, followed by an internal thought process as to the different concepts which interplay within that context. In our specific case, many concepts (e.g., malware and international relations) illustrated in the module would not be taught together during the same class session in a traditional offering, but became standard practice in context-based offering of the same course.

b) Developing a nomological network for the study module: The spider web, originally referred to as “clumpers” (Schwartz 2006), developed in Figure 1 has driven the study of concepts, their relationships, and directionality since the early 1990s. Cronbach & Meehl (1955) in describing a nomological network presented a coherent way to describe concepts and their linkages deterministically. We found this approach to be useful in our approach to context-based learning. It reinforces the logical relationships and cumulative information which arises from individual concepts. More importantly, it permitted us to examine proximal and distal relationships – those concepts which immediately support the primary theme and those which were not as well connected. For example, in our spiderweb in Figure 1, we identified the standard textbook concepts which are generally presented together and show them in the inner ring of the spider web and we then worked our way outwards by examining other chapters and concepts relevant to the theme of the information security. The spiderweb then represents a binder of ideas to present for a particular theme while parsing levels of dominance between the spiderweb circles.

c) Developing an acceptance of the emerging themes in the context: The acceptance of the emerging themes of context is critical. Often, our discussions in classes have led to rules and policies and policy making and other similar events
due to class dynamics. The speed at which this can happen often speaks to the absorptive capacity of the class and instead of trying to bring the group “back to the point,” allowing the discussion to cross conceptual boundaries can make the experience richer and longer lasting. Such an approach allows for the emergence of the themes in Figure 2 to happen rather quickly and it is important for the faculty member to let this happen while mentally recording the elegance of emergence. It should be noted that such emergence of themes is the result of a joint process – it is neither led by the faculty nor by the students. It may be difficult to assume that the emergent themes will be identical across various offerings of the course but it is reasonable to expect similar themes and allow for some outliers due to the nature of subjective discourses of facts as presented in the webspace technology.

Often, we have asked if we could provide the same experience without the webspace technology. While it might be possible, we believe it would be rather difficult to duplicate the experience of the ease of bringing the context to the lives of students in a multichannel format; making it a part of their extended classroom using mobile apps and giving them an active place in the discourse by encouraging active participation rather than passive listening.

Conclusion

An important feature which the use of technology afforded was the extension of the context beyond the classroom. The webspace is always available and the content of the webspace was pushed via a mobile app. Constant updates reminded the students of changes to the environment and created a habit endorsing process of keeping up with cyber news which, we believe, engages each student in subconscious manner by keeping the context alive at all times instead of simply being a classroom activity.

Future extensions are planned to include more curriculum portions under the context-based approach. As noted, only a small component of the curriculum (related to information security) was taught using the context created by cyberbriefs.org. The context was, however, was discovered to be useful in including several other parts of the curriculum such as information infrastructure, ITIL (Information Technology Infrastructure Library) and related standards, and HR (Human Resources) development. The webspace does show promise in its capability to expand beyond the current focus and future studies will explore this issue both from a pedagogical and technical standpoint.

We also intend to develop future studies which could examine the effectiveness of the **attained curriculum** due to the use of the webspace. While we are encouraged by informal and anecdotal evidence from classes, it is our intention to collect detailed assessment data to understand the effectiveness of the IT-enabled approach adopted for this class.
References


Appendix

Cyberbriefs KPortal webspace for Information Security

Secret Backdoor in US Phones

United States News
- Class-action lawsuit filed against Casino Rama after cyberattack
- How a Low-Carbon Economy Increases Cybersecurity Risk
- Cyber Crime Bill’s Man Arrested for Blackmailing on Facebook
- Prison terms given, trials set in Lee County cyber sex ring

World News
- Australia’s first ambassador for cyber affairs appointed
- Vodafone shares its expertise in tackling cyber warfare
- REVEALED: Chilling warning as UK banks BLACKOUT while cyber attackers threaten energy supply
- UPDATE: Fight class action lawsuit filed against Casino Rama after cyberattack - CHECK

Cybersecurity Summit at The Middletown Chamber of Commerce, Ohio, September 19, 2016

Cyberbriefs App now available on iTunes for iOS and on Google Play Store for Android

Cyber Security on
Developing a Teaching Philosophy

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Abstract

A common practice for educators is to develop a teaching philosophy which helps them become reflective practitioners throughout time on various teaching and learning strategies. This paper will specifically address: What is a teaching philosophy? What is the purpose? Who is involved? And, what is the process of creating a teaching philosophy? This information will help beginning and more experienced educators as they transform and develop their own personal teaching philosophies over time, a developmental process focused on the enhancement for student learning.

Keywords: Teaching philosophy, reflective practitioner, students, learning, process.

Universities and educational settings often request faculty to develop a teaching philosophy to showcase one’s values and beliefs related to teaching and learning. Oftentimes, the faculty member may not truly understand what this entails, thus providing the requestor with a vita of their work in teaching, rather than an actual philosophy paper on personal beliefs and values about teaching and learning. The basics of what a teaching philosophy is, the purpose, who is involved, and the process of creating a teaching philosophy is presented within this paper so that new and experienced educators can develop and transform their teaching and showcase their beliefs and ideologies related to teaching and learning to others.

What is a Teaching Philosophy?

A teaching philosophy is a narrative essay which reflects an individual’s beliefs and values about teaching and learning, often including concrete examples of the ways in which that individual enacts those beliefs. It specifically discusses the educator’s identity of how he or she educates others. A philosophy derives from reflections on experiences, thus forming specific core beliefs related to teaching and learning (Concordia University, 2012; Walcott, 1966). A philosophy not only helps an individual reflect about his or her teaching, but also helps him or her to stay focused on good days, as well as days that remain challenging and difficult. It is a reminder of an educator’s values and believes so

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that he or she strives to be consistent in his or her actions in the classrooms and his or her interactions with students.

Developing one’s teaching philosophy (or teaching statement) is becoming more common for academic faculty as well as graduate students (CRLT, 2017). Since a philosophy is a work in progress due to changes in teaching practices and professional identities, faculty should expect a philosophy to change throughout their teaching career, as experiences unfold. This may help them develop into more thought-provoking and reflective practitioners which is critical for becoming better educators as it provides a means for comparing actual teaching to beliefs and values. This philosophy often makes their implicit views on teaching and student learning explicit as they showcase what, why, and how they teach. Specific examples of course content, assignments, assessments, teaching strategies and styles are often found in teaching philosophy statements, ideologies, and theories that underlie decision-making and actions.

Since every academic discipline and academic environment has its own cultures, subcultures, expectations and requirements, teaching philosophies may appear uniquely different from one another (Ramini, 2009). A new faculty member’s teaching philosophy may also appear different than an experienced faculty member who has had numerous, diverse experiences and/or more professional development opportunities related to teaching and learning. The common ideas though that are typically found in philosophy papers include the what, why, and how of one’s teaching, showcasing not only one’s beliefs but concrete examples and experiences that expound on those specific ideas.

**What is the Purpose?**

There can be many purposes for writing a teaching philosophy. For example, an educator may want to explain to students, peers, and/or others his/her teaching beliefs and practices to support how he/she delivers content in the classroom. It may also serve as a professional growth opportunity, as an educator reflects on his/her personal teaching practices with others as a way to mentor peers. As an example, the educator may talk about the ideologies of using various teaching strategies used within the classroom so that peers can read about the educator’s philosophy and then observe the educator in action. Further, a teaching philosophy may be needed for promotion and tenure purposes along with teaching award applications so that others can further understand the purpose of the specific teaching strategies and styles utilized by the educator.

Although writing a philosophy may take time, faculty members may also want to truly identify the purpose behind their teaching strategies, styles, and values. It provides an opportunity for faculty to self-reflect and perform with a specific purpose in mind, thus enabling them to become more focused and enthusiastic about one’s teaching abilities and values (Concordia University, 2012). During self-reflection, faculty can organize ideas and assure specific examples of classroom practices are emphasized and used to accentuate the values mentioned. This self-reflective process provides opportunities for faculty to continually self-examine their teaching and the learning taking place within and outside of the classroom. As teaching practices unfold, faculty can then assess and evaluate how
their ideas and strategies work, or not work, thus leading to transformational changes in their teaching practices.

**Who is Involved?**

Although this question may seem trivial, as it is apparent the educator and students would be directly involved, an educator’s teaching philosophy may also impact other educators and/or mentees. Innovative ideas and strategies might be presented at professional development trainings and opportunities, thus providing contributions to others about teaching. Supervisors may better understand the purpose and rationale behind the faculty member’s teaching strategies, styles, and partiality to using certain tools and materials to aid in one’s teaching. This may be relevant not only for existing faculty, but for potential individuals who may be interviewing, hoping to teach within an educational setting. Individuals may also self-assess their practices by examining actions in relation to theory, beliefs, and values.

**What is the Process of Creating a Teaching Philosophy?**

When developing a teaching philosophy, several steps are involved. First, faculty should generate their own ideas, values, and assumptions about teaching and learning related to their own culture and academic world. This requires researching the institution’s mission and vision statements, including upcoming goals related to teaching and learning, and potential courses one may be teaching, as this may influence what an educator needs to know about class sizes and the types of students present within the classroom. It also requires self-examination of one’s values, beliefs, where they come from, why they are maintained, the theories one adheres to, a critical exploration of the many influences one has had on his or her experiences over the years (OECD, 2009). An educator may make a list of qualities of an effective educator, imagine oneself as the learner in the classroom, think about concrete details related to one’s teaching abilities, and write a letter and/or a memorable experience that occurred in a classroom setting to begin one’s first draft (Concordia University, 2012). A faculty member may then ask the following questions such as:

- Why do I teach?
- What do I teach?
- How do I teach?
- How do I measure my own effectiveness?

Educators should also think about who may read this philosophy, keeping in mind that it may be someone outside of the educational realm. Using first person, along with making sure the teaching philosophy is brief and well written, will provide readers with a sense of the author’s personal thoughts and beliefs. More specifically, the philosophy should avoid using academic jargon or abstract principles not known to common readers. The paper is usually 1-2 pages in length, uses present tense, includes teaching strategies and methods to help people “see” the classroom environment, and is memorable and unique to one’s own teaching experiences (University Center for the Enhancement of Teaching...
and Learning, 2017). Avoiding jargon, including core beliefs about educating others, being discipline specific, being honest about one’s teaching, and being humble, mentioning students in a non-condescending manner, will also help others identify the true purpose and thought process behind one’s teaching (Vanderbilt University-Center for Teaching, 2017).

As individuals progress throughout their teaching career, and reflect on their experiences in relation to values and beliefs, more specific questions may be answered including, but not limited to:

- What goals do I have for myself and for my students?
- How can I facilitate my students learning?
- How can I build relationships with my students?
- Why do I teach the way I do?
- What teaching methods do I rely on? Why?
- How can I create an engaging and enriching environment?
- What constitutes as evidence of student learning?
- How can I create an inclusive environment where everyone feels respected?
- How has my thinking about teaching changed over time?
- What should students expect of me as a teacher (Vanderbilt University-Center for Teaching, 2017)?

A teaching philosophy is not a review of one’s vita of what courses have been taught, but rather how the educator teaches and the theories, values, and beliefs behind those strategies. Statements need to be short and concrete, so that others can easily visualize what one’s teaching looks like within a typical classroom setting. Educators need to show humility, acknowledging that they don’t know everything about teaching and are willing to learn more, thus reflecting on past processes and experiences and adapting to new ones, showcasing a self-reflective, developmental process of one’s teaching.

**Conclusion**

A teaching philosophy is clear statement of an educator’s narrative inquiry about how and why he/she educates others. There are many reasons and purposes for writing a teaching philosophy, serving primarily as a professional growth opportunity, as an educator reflects on his/her personal experiences, and how they measure against his or her views, values, and beliefs about what it means to teach and learn. A teaching philosophy sums up one’s core values and how one will teach. As a result, it can be used in making decisions about the kind of school one selects to teach in. If a work environment is not in tune with one’s teaching philosophy, the individual will possibly burn out or be unhappy due to job dissatisfaction. A philosophy provides direction during the tough times, when one begins to doubt what he or she is doing or why, and it keeps the educator from becoming enslaved by external demands, pressures, and views that may diminish his or her agency or devalue who he or she is as a teacher.
This paper discussed the basics of what a teaching philosophy is, the purpose, who is involved, and the process of creating a teaching philosophy. Faculty should expect a philosophy to change throughout their teaching careers. Some key points to keep in mind though, is that teaching should focus primarily on students learning, therefore, the philosophy should primarily focus on this key characteristic, along with being well written, short and concise, and contain concrete examples. The paper should be grounded in one’s discipline and culture, so that it fits well with what the university and program area’s overarching teaching and learning goals and mission, yet can be converted or changed to reflect one’s developmental process to teaching. As a final thought, getting a 2nd opinion and being open to new teaching and learning strategies and ideas is crucial. Ultimately, this will also aid in the development of one’s philosophy, a progressive and ever-changing thought process on how minds are transformed and how teaching evolves over time.

References

The Misnomers of Differentiating Instruction in Large Classes

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Abstract

With increasing class sizes of diverse students, instructional options for those who teach large classes in higher education are limited. While whole-class instruction is an integral part of many classrooms and often the instructional practice of choice, this teacher-centered strategy is less effective in promoting a greater level of growth and academic success with college students. This study examined instructors’ understanding of differentiated instruction and their perceptions of the challenges to implement differentiation in large classes. Themes emerging from this study highlight the misnomers of differentiated instruction, further solidifying the need for adequate training and professional development on differentiation. Although a glimpse into the perceptions of one campus’ faculty, the results contribute to the conflicting discourse on differentiated instruction in higher education.

Keywords: Differentiated instruction, large classes, higher education, professional development.

Contemporary students not only come from diverse cultures, they have varied learning preferences. And to complicate matters even more, they also have different levels of emotional and social maturity along with a mixed breadth and depth of interests (Mulryan-Kyne, 2010; Tomlinson, 2001). The demographics of traditional age students are lower income, first generation, students of color, and immigrants who have not been served nor have achieved as well as their predecessors (Rhoades, 2012). They often deem traditional classroom activities as boring or routine and expect to be engaged by activities that produce excitement, anticipation, and engagement with other students and the course content (Phillips & Trainor, 2014; Robinson, 2013). With increased enrollments in higher education comes increased class sizes and the expectation for instructors to improve their pedagogy to deliver high levels of quality and subsequent value in the classroom. This is especially challenging in large classes; therefore, instructors need to identify effective strategies of instruction for large classes (Carpenter, 2006).

New instructors in higher education often begin teaching based on their experiences as students in the colleges or universities they attended. Many have never taken a course or

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studied pedagogical theories, thus resorting to long lectures and unrelated assignments (Mundy, Kupczynski, Ellis, & Salgado, 2012). It is likely that instructors learn to teach through experiences, observations, self-directed learning, mentoring, or attending workshops. Their efforts to improve their pedagogy are guided by their goals, knowledge, and practical experiences. Yet, instructors falling short with the knowledge needed to fully understand how to improve their teaching performance may hastily resort to using the unplanned “shotgun” approach (Murphy & Jensen, 2016). Instructors can become overwhelmed by the pressure to publish and resort to traditional teaching and assessment methods such as lecture and written exams (Mulryan-Kyne, 2010). Essentially, instructors need a framework for planning and delivering instruction so students are engaged and can make meaning of the content which is the bedrock of differentiated instruction.

Rooted in the one room schoolhouses common in the 1600s (Gundlach, 2012), differentiation is a philosophy, a set of principles about teaching and learning to which instructors proactively plan instruction to respond to student differences in readiness, interests, and learning profiles. Although it is an approach to instruction, the principles embrace a positive learning environment, quality curriculum, assessment that informs decisions, and flexible classroom management (Tomlinson & Imbeau, 2010). Carol Ann Tomlinson (2001), a leading authority on differentiation, points: “Differentiated instruction is not the “Individualized Instruction” of the 1970s” (p. 2). Since the terms have long been used interchangeably, the ongoing fusion of “differentiated instruction” and “individualized instruction” has contributed to the misunderstanding of differentiation (Tomlinson, 2001).

Albeit differentiated instruction is a promising approach for elevating student engagement and learning, these nuances of effective teaching in higher education are seldom taught (McCarty, Crow, Mims, Potthoff, & Harvey, 2016). For many students, differentiation may very well be the difference between academic success and failure (Dosch & Zidon, 2014). Given that effective differentiation requires more specific instructional strategies, instructors typically need adequate training and professional development in differentiated instructional methods. Yet, some instructors posit that the practicality of using differentiation, especially in large classes of students with a broad range of knowledge and interests, can be quite problematic.

**Review of the Literature**

Throughout life, students can choose to dress themselves from a variety of styles to match their preferences. Without explanation, we understand that this form of choice allows them to be more comfortable and to express their developing personalities. Similarly, modifying instruction for students with such diversity is more engaging and inviting (Tomlinson, 2001). As such, student diversity and background knowledge posit a critical need to differentiate instruction to ensure successful outcomes. Thus, recognizing the varied skills, cognitive development, and readiness levels of students is imperative when planning instructional techniques and strategies. This intentional approach creates an environment that embodies learner growth and success in contemporary college classrooms (Lightweis, 2013; Pham, 2012).
Differentiated Instruction

As described by Tomlinson and Imbeau (2010), differentiation is “classroom practice with a balanced emphasis on individual students and course content” (p.14). Tomlinson (2004) has offered four methods for teachers to differentiate their instruction: 1) content, 2) process, 3) product, and 4) learning environment. In short, content is the what, process is the how, product is the evidence, and the learning environment is students’ physical and psychological needs. Further suggested by Tomlinson’s model is that teachers not only promote equity and excellence through differentiating high quality content, process, and product but to also center instruction around students’ readiness levels, interests, and learning profiles (Santangelo & Tomlinson, 2009).

Differentiated instruction is an alternative to the most common teaching methodology used in higher education, the lecture (McCarty et al., 2016). When instructors differentiate their instruction based upon students’ interests, students are able to connect the content with things they already value. This interest based differentiation promotes engagement, facilitates motivation, and encourages students to recognize new interests (Santangelo & Tomlinson, 2009). Previous studies found that students generally favor differentiated instructional approaches and their achievement level is higher when compared to direct whole-class instruction (see Ernst & Ernst, 2005 and Joseph, Thomas, Simonette, & Ramsook, 2013).

Differentiated instruction is effective when it tenders expected changes in student achievement of knowledge, skills, and attitudes. The framework to maximize student learning includes the identification of students’ background knowledge and modifications to instructional content, process, product, and assessment. Even further, collaboration and autonomy develops student interactions, communication skills, and independent learning (Pham, 2012). The option to either work collaboratively or independently increases student choice; thus, increased student engagement. Recommended strategies include graphic organizers, learning centers, independent study projects, tiered assignments, learning contracts, and web-based inquiry projects (McCarty et al., 2016).

Differentiation may not be the instructional practice of choice in higher education due to the amount of time it takes to craft a variety of materials and resources to match the needs of all students (Lightweis, 2013). When done effectively, differentiation requires a significant amount of time, effort, and dedication. Preparation for any college course requires significant planning; however, engaging differentiated content, processes, and products is even more laborious. Yet, through differentiation, students develop a deeper knowledge and understanding of content, especially when activities are based upon their readiness and interests (Santangelo & Tomlinson, 2009).

Professional Development

The role of teaching in higher education is a meta-profession to which faculty have content expertise in one or more areas of their academic discipline but may lack the experience and/or knowledge of how to teach the content as well as student learning (Murphy
& Jensen, 2016). The two generally accepted theoretical views about a quality teaching and learning experience are: a) knowing how students learn and b) approaches to teaching and learning. Thus, teaching centers have been created by many institutions to support professional development for instructors in providing quality teaching and learning experiences; however, it is unclear how effective these centers are at achieving these goals (Kanuka, 2010). Not only are teaching centers underutilized by faculty, there are limited incentives and sometimes even disincentives for faculty to seek their services within the reward structures (Rhoades, 2012).

Mundy et al. (2012) suggest that professional development should include a variety of general education courses such as English/Language Arts, Mathematics, Science, Social Studies, and Cross-Disciplinary subjects. Further, a generalized professional development program should contain assessments, best practices for teaching in higher education, student engagement for retention and success, student behavior management, and current research on the effective use of technology in education. Murphy and Jensen (2016) developed the Multidimensional Matrix of Teaching Development (MMTD) to assist instructors with planning and guiding self-directed improvements in a specific component of their teaching. The structured MMTD framework is comprised of five dimensions, each containing six sub-dimensions and components to target for improvement in best practices of teaching. The dimensions are: content knowledge/expertise, instructional design, instructional delivery, instructional assessment, and course management. Using the structured MMTD framework, faculty in all stages have the ability to use feedback from students, peers, and mentors in addition to self-reflection to guide improvements in their teaching practices.

**Purpose of the Study**

Although differentiation is common in K-12 education, differentiated instruction has yet to sustain the same momentum in higher education. This study sought to examine instructors’ understanding of differentiated instruction and their perceptions of the challenges to implement differentiation in large classes. Based on the work of Santangelo and Tomlinson (2009), an online survey instrument, Instructor Perceptions of Differentiated Instruction (IPDI), was designed in order to address these topics.

**Methodology**

*Survey*

The IPDI survey questions contained seven multiple choice questions and two open-ended questions (see Appendix A). The recruitment email for the survey stated: We are interested in learning more about differentiated instruction for large classes in higher education. In short, how do instructors teaching large classes define differentiated instruction and what are their perceptions of the challenges to implement differentiated instruction in large classes? Self-reported demographic information included: gender; race; age; rank; number of years teaching in higher education; number of large classes taught, including online, hybrid, and face-to-face; and department or school teaching within the academic college.
Participants

The IPDI survey link was emailed to 108 instructors identified as teaching classes of 50 or more students within one academic college of a large research institution in southeastern United States. Of the 20 instructors (19%) responding to the survey, 13 identified as female and six identified as male ranging in age from 30 to 79 years. In terms of rank, five were instructors, five were assistant professors, six were associate professors, and four were full professors. Their number of years teaching in higher education ranged from one to more than 10 years with 50% having taught two or more large classes. Instructors represented a variety of departments within the College, the majority in Human Development (22%), Performing Arts (17%), Consumer Studies (11%), Communication (11%), English (11%), and Religion and Culture (11%). From the 9,898 potential undergraduate students attending the university, this profile represents exposure to 3,494 (35.3%) of those students.

Data Analysis and Results

First, the responses to the two open-ended questions were qualitatively examined to reveal any patterns in defining and understanding the principles of differentiated instruction. The first question asked: In your own words, please define “differentiated instruction/DI.” The last question of the survey asked participants to share any other comments that they had about differentiated instruction in higher education. Of particular interest was the identification of any shared misconceptions about differentiated instruction amongst these instructors teaching in higher education.

While differentiated instruction has been defined in the literature from theoretical perspectives, practitioners in this study delineated their understanding of differentiated instruction as process (58.9%), product (17.7%), content (11.7%), and learning environment (11.7%). Table 1 shows an excerpt of how the responses were coded and categorized.

Other survey responses align with previous research (Kanuka, 2010; Wormeli, 2005) that the principles of differentiated instruction are both challenging to understand and difficult to put into practice, especially in large classes. Instructors emphasized these challenges as: (a) class size; (b) limited face time and resources; and (c) academic pressures to meet the requirements of a research focused university. Expressions of some of the challenges are represented in Table 2.

During the next phase of data analysis, the seven multiple-choice questions of the survey were quantitatively analyzed, focusing on the type of training received in differentiated instruction and the instructors’ perceptions of utilizing differentiated instructional strategies in large classes. In terms of training, half of the instructors in this study had no training in differentiated instruction while the other half had read some literature or attended a workshop or conference presentation. When asked which factor makes differentiated instruction challenging to implement, instructors had the opportunity to select more than one response. Class size (87%), lack of instructional time (73%), and lack of resources
Table 1. Comments about differentiated instruction.

<table>
<thead>
<tr>
<th>Theme</th>
<th>Percentage</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content: what</td>
<td>11.7%</td>
<td>preparing curriculum and outcomes based on individual student needs based on personal interests, culture, ability/disability, socio-economic status, sex, etc.</td>
</tr>
<tr>
<td>Process: how</td>
<td>58.9%</td>
<td>instruction appropriate for different kinds of learners a way to best reach/teach each student</td>
</tr>
<tr>
<td></td>
<td></td>
<td>it is an approach to teaching that recognizes students have different ways of learning successfully</td>
</tr>
<tr>
<td></td>
<td></td>
<td>providing instruction that best meets the learning style and modes of each student, it means that one strategy and one style does not work for all</td>
</tr>
<tr>
<td>Product: evidence</td>
<td>17.7%</td>
<td>the instructor provides varied methods to teach and assess student learning, which increases the opportunities for students to learn and excel in the class</td>
</tr>
<tr>
<td>Learning Environment:</td>
<td>11.7%</td>
<td>dividing students</td>
</tr>
<tr>
<td>physical and psychological</td>
<td></td>
<td>the ability to perceive and address individual students' misunderstanding or lack of understanding about current class topics, usually in one-on-one encounters before class, after class or during office hours</td>
</tr>
<tr>
<td></td>
<td></td>
<td>providing customized learning experiences</td>
</tr>
</tbody>
</table>

(60%) ranked amongst the leading challenges while lack of training (27%) was seemingly insignificant.

When asked to rank the practicality of using differentiated instruction, nearly half (44%) of the instructors selected impractical but reasonable, 24% selected impractical and unreasonable, 19% selected practical and reasonable, and 13% selected practical but unreasonable. Ten (63%) considered the use of differentiated instruction as somewhat important while three (19%) viewed differentiation as not effective in higher education, two (13%) as extremely important, and one (6%) as a buzzword that will eventually fade.

**Discussion**

While the findings of this study are limited to the perspectives of one campus’ faculty, they provide a focused look at instructors’ understanding of differentiated instruction and their perceptions of the challenges to implement differentiation in large classes. Although the instructors in this study differed in terms of their perceptions, common themes were identified including: You Snooze You Lose, Toughen Up Buttercup, and Just Babble. These salient themes highlight the misnomers of differentiated instruction which
Table 2. Comments about challenges.

<table>
<thead>
<tr>
<th>Theme</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class Size</td>
<td>large class sizes make this difficult</td>
</tr>
<tr>
<td></td>
<td>differential instruction can work in small classrooms, it has no place in a large classroom at a research university; part of learning should be that you need to adapt to the environment and not expect the environment to adapt to you</td>
</tr>
<tr>
<td></td>
<td>next to impossible in a class of 450 students</td>
</tr>
<tr>
<td></td>
<td>there is no possible way of implementing this large scale; the larger the class, the LESS ability to differentiate</td>
</tr>
<tr>
<td>Limited Face Time and Resources</td>
<td>with limited resources and pressures to meet many other educational and performance goals, it is often very hard to fully offer what might be the best in meeting students’ needs</td>
</tr>
<tr>
<td></td>
<td>most of us don't even have graders so it's difficult to manage the ideal teaching strategies</td>
</tr>
<tr>
<td></td>
<td>today we are teaching many more students with special learning needs and cultural/language issues that the challenge is [an] even greater issue</td>
</tr>
<tr>
<td>Academic Requirements</td>
<td>faculty are encouraged to do the things that make it easier for them, so they can focus on grants and research; they are not rewarded for putting extra into teaching</td>
</tr>
</tbody>
</table>

subsequently parallel some of the myths proposed by Wormeli (2005) and misunderstandings suggested by Tomlinson and Imbeau (2010).

You Snooze You Lose

As Chamberlin and Powers (2010) observe, some instructors in higher education embrace differentiated instruction, while most use the traditional lecture format. Instructors in this study (87%) preferred direct whole-class instruction such as teacher-led discussions and demonstrations as the instructional strategy of choice. Albeit differentiated instructional practices are beneficial, the progression past whole-class instruction creates apprehensions and challenges for instructors in higher education (Joseph et al., 2013; Kanuka, 2010) as quantified in this study as class size; limited face time and resources; and academic pressures to meet the requirements of a research focused university.

Given that all students will not be able to demonstrate mastery on the exact same day, instructors should teach so students learn, not for the purpose of documenting deficiencies (Wormeli, 2005). When instructors differentiate instruction, they shift from being
Developing a Teaching Philosophy

Theses depositories of information to facilitators of learning opportunities. While content knowledge continues to be important, the focus is less on knowing all the answers and more on reading students in order to create pathways to learning (Tomlinson, 2001). This is especially critical when considering today’s contemporary students. As Caruth (2016) described, “they are self-assured, accomplished, active, intelligent, and motivated” (p. 38). They need organization and feedback on their progress (Caruth), and find it difficult to focus in class when information is received passively (Phillips & Trainor, 2014; Robinson, 2013). Most students not only have a preference for active learning experiences, but active and collaborative instructional methods produce significant improvement in learning outcomes (Carpenter, 2006).

For some instructors in this study, the consensus was that students should adapt to the learning environment presented to them; the learning environment should not adapt to students. One instructor noted, “it is a pipe dream and may well open the door to legal challenges since DI does not treat all students the same and how is one to grade students using different scales for the same class and credit?” Another instructor commented, “there is no possible way of implementing this large scale; the larger the class, the LESS ability to differentiate.”

Toughen up Buttercup

If instructors neglect to strategically differentiate, not all students will learn enough course material to succeed. Instructors commented, “there is a very fine line between what is the responsibility of the teacher for teaching methods and what is the responsibility of the students for accepting new methods of learning” and “part of learning should be that you need to adapt to the environment and not expect the environment to adapt to you.” If students should "toughen up" in order to succeed in higher education, instructors should differentiate. After all, we are living in a differentiated world (Wormeli, 2005).

In other words, the things that we share in common is what makes us human. How we differ is what makes us individuals. Student similarities take center stage in a class with little or no differentiated instruction while student differences emerge as important elements in teaching and learning in a differentiated classroom (Tomlinson, 2001). In order to be able to provide students with an appropriate college education and to prepare them for successful futures, it is important to know who they are and to meet their needs and wants (Caruth, 2016; Phillips & Trainor, 2014). Through diverse forms of content delivery, instructors can remove barriers that students have with transferring what is presented into meaningful patterns in their own knowledge (Schreiner, Rothenberger, & Sholtz, 2013).

Just Babble

Instructors in this study held basic ideas of differentiation and somewhat utilized differentiated strategies in their large classes. Instructors claimed that they were not differentiating their instruction for diverse learners, but when pressed to define differentiation, some offered contrasting and even misinformed descriptions. For example, “what I do [in
class] would probably not be defined as that: I give every student a variety of avenues for learning … with the hope (and the experience) that each student will find several that work well.” Here, a principle of differentiated instruction is described correctly, yet the instructor believed it was incorrect. Further, this example is a shared misunderstanding of differentiation in that it is something an instructor does or does not “do” to students (Tomlinson & Imbeau, 2010).

There was also a lack of knowledge about the research supporting differentiated instruction. For example, one instructor stated that differentiation is “a jargon term used to describe a theory of education that is not based on any actual empirical evidence.” Although the principles of differentiated instruction are embedded within the text of scholarly research articles, the case could be made that the term may not necessarily be cited within the title nor explicitly within the text (see Carpenter, 2006; Hunt et al., 2016; Kanuka, 2010; Murphy & Jensen, 2016; Solis & Turner, 2016). Yet, another instructor summed, “differentiated instruction IS a buzzword for what good teachers have been doing.”

**Conclusion**

For decades, there has been a concern for the lack of preparation of faculty in service and teaching (see Murphy & Jensen, 2016). Awareness and training are successful pathways to create instructional change (Dosch & Zidon, 2014). With diversity on the rise in higher education, the dominating teacher-centered model of lecture-style teaching poorly serves students (Dosch & Zidon, 2014; Ernst & Ernst, 2005). Faculty are the cornerstones to student success, not just as single entities in increasingly large classrooms, but as a cooperative engaged in a variety of departmental and institutional initiatives to improve student achievement (Rhoades, 2012). As such, there is a growing need for teacher development centers in higher education to enhance and support quality teaching and learning (Kanuka, 2010).

Instructors in this study lacked adequate training in differentiation. This lack of training explains the conflicting responses to define differentiated instruction and thusly, the misnomers of differentiation. In order to implement these strategies, instructors need specific training and professional development opportunities to improve practice. Facilitating the use of differentiated instruction will only be realized if instructors fully understand the principles, skillfully use a variety of the strategies, and tender endorsement of differentiation (Santangelo & Tomlinson, 2009). Thusly, it is important to abandon traditional teacher-led instructional strategies. Although differentiation is complex and no polished solutions are guaranteed (Tomlinson, 2001), differentiated instruction in higher education is achievable (Ernst & Ernst, 2005), even in large classes. Because students differ significantly, there are no right ways in teaching and learning strategies (Chamberlin & Powers, 2010; Pham, 2012; Santangelo & Tomlinson, 2009). At its best, teaching should converge learning principles with practical applications linking learning to real-world situations, a keystone for learners to learn, think, and grow together (Caruth, 2016; Pham, 2012). Emerging teaching strategies in higher education often include a compilation of face-to-face and online methods along with a campus-wide welcome to effective teaching practices. This aligns well with the definitions of differentiated instruction (Kanuka, 2010).
A key component in differentiated instruction is providing students with a variety of choices in both products and performances so they can best demonstrate what they know, what they understand, and what they can do (Lightweis, 2013). When offered choices about materials, activities, and assessments, students feel a sense of empowerment which enhances their interest in a course. Allowing student choice with assignments or flexibility with due dates empowers students (Joseph et al., 2013) and thereby increases their engagement (Dosch & Zidon, 2014). Examples of student choice include: provide a list of several texts so each student can choose the one that is of interest to them, or offer students a menu of options for completing a related assignment (i.e. deliver an oral presentation, create a slideshow with text and images, or write a traditional essay). Another strategy the instructor can use to differentiate instruction is sharing a story that relates to the content or allowing students to share stories and allow student choice. Storytelling motivates students and allows them to develop a greater understanding of course content when the story is applicable to the course as well as their lives (Solis & Turner, 2016). Students often enjoy conversing and learning from one another, offering their opinions, and sharing their personal experiences (Schreiner, Rothenberger, & Sholtz, 2013).

Albeit differentiating instruction can be challenging, students are held accountable and are likely to achieve more. A my-way-or-no way instructional approach allows students to either sail or encourages them to drop the course (Wormeli, 2005); thus, a clear mismatch between instruction and meeting the academic needs of diverse students (Dosch & Zidon, 2014). Instructors who engage principles of differentiated instruction in the classroom understand that every student differs with respect to their learning styles and preferences. Consequently, this allows instructors to be receptive to each student’s background, personality, and abilities (Anderson, 2007). Though the goal for each student is challenge and growth, instructors should define challenge and growth differently in response to the varied levels of students’ interests and readiness (Tomlinson, 2001).

Differentiated instruction is not new to teaching and learning. Findings from this study contribute to the discourse on differentiated instruction by providing specific information about what instructors in higher education perceive to be differentiation. The ability to capture evidence of instructor’s reasoning and/or misconceptions associated with the principles of differentiated instruction and the application of such strategies in large classes highlights the need for professional development opportunities which in turn will better serve our students and institutions.

References


### Appendix A: IPDI Survey

1. In your own words, please define “differentiated instruction/DI.”

2. How would you describe your use of differentiated instruction?
   a. I use differentiated practices on a regular basis.
   b. I use differentiated practices sporadically.
   c. I do not use differentiated practices.

3. Which type of training in differentiated instruction have you received?
   a. Attended several workshops and/or conference presentations.
   b. Attended a workshop and/or conference presentation.
   c. Read some literature.
   d. None.

4. How often do you engage in direct whole-class instruction such as teacher-led lecture and/or demonstrations?
   a. Always (60% or more).
   b. Often (40% - 60%).
   c. Frequently (10% - 40%).
   d. Seldom (under 10%).

5. How would you describe your personal opinion about using differentiated instruction in higher education?
   a. Extremely important.
   b. Somewhat important.
   c. A buzzword that will fade.
   d. Not effective in higher education.
6. How would you describe the practicality of using differentiated instruction in higher education?
   a. Practical and reasonable.
   b. Practical but unreasonable.
   c. Impractical but reasonable.
   d. Impractical and unreasonable.

7. How would you describe the benefits of using differentiated instruction in higher education?
   a. Significant and worthy of the effort required to implement.
   b. Significant but not worthy of the effort required to implement.
   c. Insignificant but somewhat worthy of the effort required to implement.
   d. Insignificant and not worthy of the effort required to implement.

8. Which of the following makes differentiated instruction in higher education challenging to implement? (select more than one answer if applicable)
   a. Lack of training.
   b. Lack of resources.
   c. Lack of instructional time.
   d. Class size.

9. Please share any other comments that you have about differentiated instruction in higher education.