STUDENT ENGAGEMENT IN UNIVERSITY CLASSES

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It is noted having the instructor provide all knowledge to the passive student is the old paradigm[1]. The new paradigm is to actively engage students with the material and one another. Educators are finding challenges with the way things are being done and have experimented with and tested alternative methods of teaching. In addition, national studies are examining alternative teaching and evaluation of university effectiveness in an effort to further understand and improve education. The article examines three relevant areas of education. First, research in physics education is discussed, as this area has well established a standardized national test for measuring conceptual understanding and has test score gains for traditional as well as engaged classes. Second, the National Survey of Student Engagement (NSSE) is discussed, as this instrument has focused on the important issue of how students are utilizing university resources for learning rather than simply reputation of a university, size of a library, alumni giving, etc., and provides the instrument for the analysis. Finally, the problem-based learning (PBL) method of instruction is discussed. As McKeachie and Gibbs have stated, "PBL is one of the most important developments in contemporary higher education"[2]. The research was carried out to test the engagement of students in the PBL classroom, and involved developing an instrument based on the NSSE instrument. Essentially, engagement is the goal and PBL is the means to reaching the goal, which is why it is important to include literature concerning each of these areas.

PHYSICS EDUCATION
Physics education is one area that has been reforming teaching methods. Many faculty end their physics courses disappointed with the limited ability of their students to apply what they have learned. In an effort to remedy this problem, educators have adopted interactive approaches to teaching. Hake defines interactive engagement methods as those designed to gain a conceptual understanding through heads-on (always) and hands-on (usually) activities that result in immediate feedback with peers and instructors[3].

NATIONAL SURVEY OF STUDENT ENGAGEMENT
Evaluating higher education institutions has, in the past, been based on indicators ranging from tuition to institutional size and average GPA to average annual alumni salary. Although this information is important, it is also important for institutions to address information related to student engagement in the university environment. The National Survey of Student Engagement (NSSE) is an ongoing research campaign in the USA used to assess the extent to which colleges and universities are participating in educational practices that are strongly associated with high levels of learning and personal development. NSSE data focus on something far more important, namely how students use resources for learning. The survey examines the environment of college students, but is also intended to foster a particular way of thinking and talking about collegiate quality. The first national report emphasized the important link between effective educational practices and collegiate quality by featuring five benchmarks of effective educational practice. These benchmarks were created using student responses to 40 key items from the original survey. The benchmarks include: level of academic challenge, active and collaborative learning, student interactions

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with faculty members, enriching educational experiences and supportive campus environment[4]. Results of the national survey are highlighted in the NSSE Overview report from 2000[5]. Multivariate regression analyses for patterns of student engagement reveal significant information about predictive behaviors. Seniors were more engaged than first-year students in good educational practices.

PROBLEM-BASED LEARNING

The concept of PBL was seen 30 years ago as an alternative to the traditional means of education in medicine. The origins of PBL lie heavily within medical education and much research done on PBL is within medical literature. PBL was introduced in 1969 in Canada's McMaster University Medical School, which included elements of curricular innovations used in a hybrid program from the late 1950's at Case Western Reserve University Medical School[6]. Today, elements of these pioneer programs can be found throughout the educational system around the world. PBL has been integrated into numerous areas of study, including dentistry, pharmacy, optometry, nursing, law, business and education. However, there are many additional areas of study that have yet to make their mark with PBL. The University of Delaware (UD) can be credited with the incorporation of PBL into their curricula in 1992. The revision began in the Medical Scholars Program. PBL had been used in medical education previous to this time, but not widely known by undergraduate faculty. Because of faculty unfamiliarity and intimidation, an Institute for Transforming Undergraduate Education (ITUE) was developed. Hundreds of faculty fellows participated in workshops to train and educate on PBL methods. From their inception, the PBL program at Delaware has gained national recognition and remains a model for others. The Center for PBL at Samford University was started in 1998. Samford University, funded by two grants from the Pew Charitable Trusts, has incorporated PBL into their undergraduate courses and documented the best models of PBL in their courses (Baldwin & Strickland, 2003). PBL involves confronting students with a problem related to the class material as opposed to traditional didactic approaches to education[7]. The problems that students face in these classroom simulations are loosely-structured situations designed to create an environment that allows students an opportunity to explore and learn. Bridging the theory–practice gap allows for far greater learning and is why PBL has been so highly regarded in recent years. Moreover, when students are provided opportunities to learn material in the contexts where they will be used, they are more likely to retain the information and are better prepared to handle life and its challenges[8]. PBL is a group-based teaching technique. Groups (typically referred to as learning groups or cooperative base groups) are made up of five to eight students to work through the problem together, while using a trained facilitator to guide the learners without teaching them in a traditional manner. Having someone for the groups to look to for guidance leads to a richer, more holistic level of learning. In fact, the "success of any PBL curricular initiative requires the assistance of faculty skilled in PBL"[9]. Through the process of working together, learning takes place. The group members interact to solve the problem and this discourse eventually leads to a solution. The discourse within the group "consists of a dynamic sequence of conversational exchanges that evolves over time as the participants in the group collaborate to develop alternative models of a case and use them in solving a diagnostic problem"[10]. Various research studies have explored the sequence for conducting PBL, but key elements are characteristic of each. One, PBL is recognized for its shift from focusing on the teacher to a student-centred education with process-oriented methods of learning. The primary objective of PBL is to create an environment that allows students to become life-long learners. Because of this process-oriented approach, different instructors apply PBL differently and at various levels of integration. Instructor use ranges from periodic integration with one-class session problems to semester-long projects that require complete emersion in the problem. PBL can be used in the classroom at various levels of the continuum. Two, PBL emphasizes understanding concepts, thinking critically and working collaboratively with others. Self-direction and reflection are key contributors to the process, which is of greater importance then the product In the end, synthesis and review are necessary to complete the process including evaluations of self, peer and tutor/facilitator[11].

Group work is a common active learning strategy in higher education when the goal is to enhance deep learning and develop teamwork skills. Culturally diverse learning groups are particularly valuable in preparing university students to participate in a globalized world. Student engagement in group work is critical in realizing these

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benefits. Therefore, more insight into what factors promote engagement is necessary. This study investigates the extent to which trust in the group, cultural diversity in the group, and group formation contribute to behavioral and cognitive engagement in group work.

Higher education increasingly uses collaborative learning groups, because working as a group on a common task or problem can be an effective way to equip students with teamwork skills, which are highly valued in the professional world. Compared with individual learning, collaborative approaches promote higher-quality learning, deeper understanding of course content, more creativity, greater retention of material, and greater student satisfaction[12]. Moreover, as higher education continues to internationalize, student populations grow more culturally diverse, and the likelihood of students participating in intercultural group work during their studies has increased as well. Adding the intercultural aspect to collaborative learning groups provides opportunities to develop valued skills and attitudes, such as intercultural competence, intercultural communication and collaboration skills, and a global mindset[13]

STUDENT ENGAGEMENT IN GROUP WORK

Knowledge does not develop in a vacuum but is constructed as a communal accomplishment within historical traditions of cultural practice[14]. Group work is a teaching strategy that deliberately creates a social setting for learning to enhance deep learning, however a group assignment in itself does not guarantee knowledge co-construction; it is through communication, interaction and collaboration that knowledge is co-constructed. Students need to truly engage with their group members, the assignment, and the different perspectives in the group to benefit from this social learning setting.

Besides its contribution to deep learning, student engagement is also linked to positive outcomes such as study success, persistence, high academic performance, self-esteem, psychological development, and student satisfaction. Although the importance of the construct is widely accepted, definitions of student engagement and its sub-dimensions vary. For this study, we define student engagement as "the quality of effort students themselves devote to educationally purposeful activities that contribute directly to desired outcomes"[15]. Common sub-dimensions of engagement include: behavioral/academic engagement, which involves attendance, participation, persistence, and preparation for class; cognitive engagement, which refers to the mental energy students apply to learning and self-regulation; and emotional engagement, including interest and identification[16].

Because engagement is crucial for effective, productive, collaborative group interactions, it is important for educators to know which factors promote or hinder it. We consider three factors that appear specifically relevant to group work in an international learning environment: 1. cultural diversity in the group, 2. group formation, and 3. trust in the group. These factors have been investigated in relation to outcomes such as student satisfaction and performance, but their influence on student engagement remains under-explored.

CULTURAL DIVERSITY IN THE GROUP

Culturally diverse teams have the potential to be more creative and innovative, with more positive impacts on problem solving, than single-culture team. Culturally diverse students bring a variety of perspectives and approaches to the group, which contributes to the quality of learning and decision making. However, culturally diverse learning groups also face challenges, such as misunderstandings, different views on how the assignment should be undertaken, different expectations of the group work, and language barriers. In terms of sociocultural learning theory, these struggles can be viewed as the process of acquiring new psychological tools. According to Vygotsky, learning through social interaction is mediated by tools such as language, signs, symbols, and gestures. Each culture has its own set of psychological tools, therefore a multicultural group can be viewed as a co-presence of different systems of psychological tools. For students to learn together through social interaction in an internationalized setting, they will have to acquire a new, shared system of psychological tools[17].

Cultural diversity thus could affect engagement positively or negatively. On the one hand, developing a shared system of psychological tools requires time, effort, and commitment, which results in higher behavioral engagement. On the other hand, cultural diversity might lead to group conflicts, which can cause students to withdraw from the group and decrease their behavioral engagement. Similarly, cultural diversity might enhance critical thinking through discussions and incorporation of different (cultural) perspectives, resulting in higher cognitive engagement. However,

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the lack of a shared system of psychological tools might decrease cognitive engagement, because students struggle conveying their thoughts and understanding their peers.

GROUP FORMATION

Some research studies suggest that group formation through self-selection is preferable, because it has a positive effect on student attitudes and outcomes. Chapman finds that students who are free to choose their own group members assess the group process as more valuable and effective than students randomly assigned to groups. Other studies suggest that teacher selection is preferable though, because it ensures group heterogeneity, which contributes to the quality of learning. In heterogeneous groups, students with different skills, talents, achievement levels, and social and cultural backgrounds can complement one another; homogeneous groups lack this synergistic diversity[18].

Whether students have a say in whom to collaborate with thus likely affects their level of engagement. When given a choice, students tend to choose to collaborate with friends, same-culture peers, and similar-achieving peers. Entering into dialogue might be easier in this case than with students they do not know. At the same time, critical dialogue might diminish if group members think more alike or feel they cannot challenge their friends' views.

TRUST IN THE GROUP

Trust is essential in facilitating effective group work. Trust represents "one party's (the trustor) confident expectation that another party (the trustee), on whom the trustor must rely, will help the trustor reach his or her goals in an environment of risk and uncertainty"[19]. In group work, students must rely on one another, and their learning, grades, and ability to reach their goals depend at least partly on the other group members. When trust among group members is high, they are more willing to share their thoughts, perspectives, opinions, and information; are more open to considering other points of view; and generate better solutions.

In the context of higher education group work, students are often expected to collaborate on a project for a relatively short time, which is not conducive to gradually building trust. Instead, trust may be based on easily observable characteristics, such as visible similarities, effort put toward the group work, reliability, or communication. The limited time puts multicultural groups at a disadvantage because communication can be difficult and students may be less likely to trust group members who have a different ethnic appearance or display behaviors that are deemed different. In addition to differing in the time needed to establish trust, cultures vary in how trust is developed and expressed. For example, people from cultures that prefer direct communication might interpret an indirect communication style as withholding information, which can appear dishonest or untrustworthy. Given limited time and cultural differences, trust building in multicultural groups will be more difficult than in single-culture groups.

Sharing personal perspectives, being critical of one's own ideas, and being willing to consider other views can be a vulnerable position. Therefore, greater trust in the group most likely results in greater cognitive engagement. Behavioral engagement also might increase as trust increases. When students have confidence in their group, they feel encouraged to invest in group work by attending meetings and completing assigned tasks.

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