Transformative Pedagogy as a Reflective Approach for Promoting Intercultural Self-Awareness In the Context of Teamwork

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Abstract—**This study implemented transformative pedagogy as a reflective approach to promote intercultural self-awareness and its potential consequences in the context of teamwork. The context was a second-year systems analysis and design course with 118 students in the fall 2021 semester and 155 students in the spring 2022 semester. The research question was: What are students' beliefs regarding their own cultural values and the potential implications of those values on their teamwork interactions? Findings from the study indicate that students realized that team dynamics and values are crucial to team experience. We found that students believed that commitment to the team and communication of values contributed to the experience of teamwork and teamwork success. Students also believed that coming together and making decisions together in a collectivistic manner would help the progress of the team.**

Keywords—component, formatting, style, styling, insert.

I. INTRODUCTION

Effective team interaction is critical for the organization. With technology connecting us to people from around the world more easily than ever before, entities are becoming more globalized by the day. This enables people to interact with others from around the world, where cultural norms and values may vary greatly from what one is familiar with. A lack of proper understanding of these cultural values can cause communication problems in the academic and professional spheres. Thus, higher education institutions must better prepare future professionals capable of effectively communicating and interacting with teams locally and globally.

Previous studies have suggested that understanding one's own cultural values and different cultural backgrounds affects teamwork styles, efficiency, and outcomes. To support future professionals in their development of teamwork skills and to prepare them to collaborate globally, higher education institutions have integrated teamwork practices and pedagogies to support students in their group projects. However, students may experience challenges within their teams due to ineffective communication. Ineffective communication can be attributed to multiple factors, such as lack of engagement or differences in cultural backgrounds. Thus, the training of future professionals should consider these potential issues so that conflicts can be avoided or managed properly.

To take steps toward addressing potential communication issues within teams, this study investigates the effectiveness of integrating elements of intercultural pedagogy to support teamwork processes. Specifically, as part of an information technology course, this study implemented transformative pedagogy as an approach to promote cultural self-awareness in the context of teamwork. The goal of our research is to analyze patterns of self-awareness in the context of cultural values and virtual teamwork. The specific research question is: What patterns can be found in students' self-awareness regarding cultural values in the context of virtual teamwork?

II. BACKGROUND

Future professionals need to develop teamwork skills, even more so within the Information Technology (I.T.) field. As I.T. projects are becoming more globalized and professionals are faced with the task of dealing with many different professionals around the globe, the need to develop cultural self-awareness is imperative for a successful and smooth teamwork interaction [1]. Cultural misunderstandings could spark small problems that could snowball into larger ones, which may not be problematic if one had understood their own cultural values and others' values. Without cultural understanding, this would hinder the effectiveness of teamwork sessions and outcomes.

A. The Role of Culture in Teamwork

Researchers have analyzed how culture and communication work hand in hand in order to facilitate interactions in the workplace. Specifically, Hofstede [2] described six dimensions of culture: uncertainty avoidance, power distance, individualism versus collectivism, masculinity versus femininity, uncertainty avoidance, long versus short-term orientation, and indulgence versus restraint. These cultural dimensions can be made distinct by the basic problems of society and societies' ways of communicating. Hofstede [2] identified that misunderstandings related to these cultural value orientations might result in common problems that employees had to deal with. They dealt with situations emerging from dependence on superiors, the need for

regulation, the balance between themselves and the company to find purpose in their actions, and ego values.

In another study also performed in an organizational context, six teams consisting of South Korean and Norwegian engineers were studied [3]. In this study, teams that missed social and cultural cues were found to have problems when working together. For example, due to Korean culture and the importance of not losing face, Koreans would often fix their problems secretly without involving others when making a mistake or would agree to complete certain tasks even though they would disagree with the assignments. Inexperienced Norwegians would miss these cues and believe that the Koreans had agreed to do something, only to find that it had not been done [3]. To solve this problem, the Norwegians learned to be more detailed in their conversation. They also used heuristics as workarounds. This shows that cultural awareness is imperative for efficient teamwork sessions in order to minimize misunderstandings.

Research in the context of higher education has also identified how students' cultural backgrounds also influence their teamwork interactions. For instance, a study conducted in a first-year engineering class identified the role of cultural backgrounds in the classroom environment [4]. While most would think that language barriers would be a main impediment to the success of their work, it was found that cultural differences affected performance more than any language barrier. The researchers found that there is a weak correlation between TOEFL scores and undergraduate students' GPAs, which suggests that, while language proficiency is necessary/may help a student, it is not sufficient for non-U.S. students to be successful in U.S. universities. Indeed, a study conducted in 2023 found that students in a course offered at a U.S. institution identified more closely with cultural values such as individualism, equality, monochronic, meritocracy, informality, personal efficacy, and directness [5]. Such orientations reflect how students interact with their peers and their instructors. For instance, U.S. classrooms are highly participative, and this can be attributed to U.S. culture, which displays low levels of power distance and high levels of individualism [6]. Students also interact with their instructors and teammates in a variety of ways, where the instructor is a facilitator of the learning process. However, in societies (like India and China) with lower levels of individualism and high levels of collectivism and power distance, teacher-centered education is preferred, where students do not have much interaction with the teacher or with each other. The study by Jimenez-Useche and colleagues within the first-year engineering class showed significant differences in the performance of students with similar language backgrounds and different countries of origin but no significant difference in the performance of students with different language backgrounds from the same country [4]. This shows that there is a more prominent influence of cultural differences in the performance of non-U.S. students as compared to language barriers.

B. Teamwork Training

There are many factors that can affect effective teamwork interaction. For example, a study conducted in 2008 identified that information distribution, uncertainty, role ambiguity, effective leadership, and possible conflict among members can influence teamwork interactions [7]. To overcome these challenges, teams need to develop team processes, trust, cohesion, and information processing abilities. A way to promote effective teamwork is through training and professional development. Another study conducted in 2008 specifically determined three types of effective teamwork training [8]. These are cross-training, coordination and adaptation training, and team self-correcting training. Team training interventions are more effective for team processes than for other outcome types.

Team training is defined as a systematic intervention designed to facilitate job roles [8]. It enables individuals to learn about and practice team competencies and performance processes while receiving feedback. Team training is the "optimal combination of tools (team task analysis), delivery methods (practice-based, information-based, demonstration-based), and content (knowledge, skills, attitudes)" [8]. Larger teams have been found to improve team performance, while smaller teams have been found to improve team processes. This shows that when a team is trained on how to communicate properly, they might have an easier time maintaining those process enhancements.

Training can also be provided to develop intercultural competence, facilitating communication and understanding among team members. For example, a study in 2006 proposed that developing requirements is a multi-person job that involves coordination among application domains, contradictory requirements and priorities, and interdependent modules, tasks, and people [9]. It was previously thought that coordination revolved through the Input-Process-Output model, but new studies suggest that the team's cognitive and social ability, such as developing shared mental models, is how coordination is achieved. This means that team members can coordinate their actions by having a collective understanding of the work, the organization and its goals, and the other members. Specifically, "as the size of the requirements engineering team grows and the interdependencies among modules and tasks increase, the coordination processes enacted among the requirements engineers and developers become extremely complex and troublesome" [9]. When teams fail to coordinate, this results in breakdowns in which members lose sight of the team's goals, work, and progress, which lessens their contributions to the project.

The preliminary work suggests the need to prepare students to enact teamwork skills. Thus, the need for teamwork training and teamwork pedagogy is crucial in higher education, as it is a stepping stone for students going into the professional world. No matter what field the students choose, they will have to interact with people from around the world and understand their cultural values, which may be different from those they hold.

III. Conceptual Framework

The conceptual framework for this research is transformative pedagogy. The purpose of transformative pedagogy is to analyze social life and cultural beliefs through a lens of diversity to prepare students to be transformative agents. They become a basis for ethical responsibility and conducting critical analysis [10]. Educational institutions should utilize diversity present on campus to create learning opportunities for students to learn from one another.

There are five main principles of transformative pedagogy, which include creating a safe environment; encouraging thoughts about their experiences, beliefs, and biases; using discussions and reflections to promote student engagement

and participation, posing real-world problems, and helping students implement action-oriented solutions [11].

A. Implications of the Framework for the Study

Transformative pedagogy was used as an approach to help students become aware of their cultural backgrounds and how these may influence their teamwork interactions [12]. Specifically, transformative pedagogy allows students "to examine their assumptions critically, grapple with social issues, and engage in social action" [11]. Students apply transformative pedagogy by reflecting on their experience and putting this into action in the context of the team. Students reflect on how their cultural background may influence their communication with the team. For example, some students may be quieter and more reserved and tend to keep problems that they encounter to themselves instead of sharing them with the team, as they do not want to feel like they are burdening their teammates. However, once one has realized their cultural self-awareness, they could be more inclined to open up to their team more and discuss their problems in order to resolve such problems, as they have learned that good, open communication is crucial in a team setting.

Implications of the theoretical framework for the learning design would be to promote students' development of teamwork skills in the context of their cultural and communication styles [13]. Specifically, students participated in weekly in-class guided reflections during the first four weeks of the semester in preparation for the team-based semester-long project. The students' reflections encouraged each individual to actively reflect on their past experiences and beliefs and set them for future actions and coordination with their team members. The reflection questions placed emphasis on promoting intercultural awareness and communication skills. As students became more aware of their own beliefs, values, and actions, students were encouraged to take better courses of action in the context of their team interactions.

IV. METHODS

This descriptive study investigated students' perceptions of their intercultural values and awareness and also evaluated patterns in students' perceptions of their cultural backgrounds in regard to teamwork. The students were asked to individually complete three self-reflection surveys throughout the semester regarding their teamwork interactions. The specifics of the study design and implementation are explained in the following sections.

A. Context and Participants

The context of this study is an undergraduate course introducing methods for information systems analysis and design. The class teaches a comprehensive introduction to information systems development, including the tools and techniques for systems development. Topics include requirements determination, the systems development life cycle, methodologies, development technology, systems planning, project management, systems analysis, systems design, systems implementation, and systems support.

The data for this study was from the Fall 2021 semester (118 students) and the Spring 2022 semester (155 students). These two semesters used a hybrid teaching mode, which included in-person and online teaching, where students completed a semester-long software development project. Table 1 shows the distribution of the class demographics according to institutional data. In the Fall of 2021, the percentage of female students was 25%, and in the Spring of 2022, the percentage of female students was 24%.

TABLE I.   CLASS DEMOGRAPHICS

Table Column Head		
Race/Ethnicity	*Fall 2021*	*Spring 2022*
White	48.31%	52.90%
Asian	22.88%	16.77%
International	11.02%	13.55%
Hispanic/Latino	8.47%	9.68%
Two or more races	5.08%	2.58%
Black or African American	2.54%	2.58%

B. Procedures and Data Collection Method

During the first week of classes for both semesters, students were asked to reflect on their cultural backgrounds and how those may influence their teamwork interactions. The specific reflection prompts were:

- Why did you select the three contrasting value orientations as the most relevant for you?

- How do you think each of these three contrasting value orientations may influence (positively and negatively) your teamwork interactions?

- What are possible strategies you could follow so these contrasting value orientations do not negatively influence your teamwork interactions?

Students responded to these reflection prompts during class time. They submitted their responses to be considered as class participation.

C. Data Scoring and Data Analysis Methods

Students' responses were analyzed by using qualitative and computer-based methods in order to combine the strengths of both approaches. While qualitative approaches allowed us to get insights from the data, the computer-based approaches allowed us to analyze the complete dataset to identify prominent themes from student reflections. Specifically, we used the Latent Dirichlet Allocation (LDA) topic model [14] using MALLET library [15] to determine the prominent topics from the collection of student reflections and their prominence within each question. The LDA model requires a number of topics to be inputted. The optimal number of topics for the topic model is dependent on the nature of textual collection and was determined using the CV Coherence value, which has been found to be well-correlated with human judgment by previous studies [16]. Then, we qualitatively analyzed the data output from MALLET to define themes within the identified groups. These themes were used to describe the data. Specifically, the themes of the generated topics were determined by qualitatively reviewing the top words representing the topic and the reflections where that topic was most prominently present, as used in previous studies [17]. The detailed steps are mentioned below.

First, the textual dataset containing student reflections was cleaned from any non-alphanumeric symbols and characters using macros in Microsoft Excel. Then, the cleaned data was used as input for determining the CV_Coherence values using the PyLDAvis Python library [18] in Jupyter Notebook. The

CV_Coherence analysis allowed us to best determine the number of topics for the student's responses. We tested out a range of input topics between 5 to 10 topics and determined the optimal number of topics corresponding to the topic with the highest associated CV_Coherence value. The optimal number of topics was then used for developing the LDA topic model using MALLET library.

After inputting the cleaned text file to MALLET, we removed the stop words as a preprocessing step and then developed the LDA model using the optimum number of topics as input. MALLET generated two output files: (a) the keys file listed the topics with associated top-20 words and topic weights for the dataset, indicating how commonly that topic was present, and (b) the composition file that indicated the distribution of topics in each document through a document-topic weight measure.

These composition files and the key files were exported into Microsoft Excel and then used for our qualitative analysis to interpret the theme of each topic generated by the LDA model. To do this, we first determined a high-level theme for each topic by analyzing the top 20 words representing the topic. Next, we identified the most weighted topic in each student's response in Excel and sorted the responses in decreasing order of maximum topic weight. We then revalidated the high-level topic themes determined in the previous step and refined them further by checking the composition file and qualitatively examining the students' responses most strongly associated with each topic.

D. Trustworthiness, Validity, and Reliability Considerations

The validation procedure consisted of two researchers independently interpreting topics based on the top 20 words. Then, the two researchers discussed their interpretation together by jotting down the top themes identified and narrowing the analysis down to the similarities until they reached an agreement. This ensured inter-rater reliability. Then, we checked back on each student's responses, sorted by document-topic weights for each topic, to understand if there were any agreements or disagreements with the student's responses. With some topics, we saw that there was a different interpretation after reading students' responses as compared to the initial themes estimated after reading the top 20 words. Most topics, however, stayed consistent with our initial qualitative interpretations, which also strengthened the validity of our interpretations.

V. Results

Through the CV Coherence analysis, we determined that the optimum number of topics was 8 for both the collections of responses, Fall 2021 and Spring 2022. The topics identified for Fall 2021 and Spring 2022 and their associated weights are presented in Figures 1 and 2, respectively, and the most prominent topics are discussed in detail. The most common topic present in the reflections reported by students in the Fall 2021 semester, as shown in Figure 1 (topic 7), consisted of themes related to harmony, conflict, and resolution. The detailed theme interpreted for topic 7 was: The students felt as though their contrasting cultural backgrounds did not help in their progress, but coming together and deciding on solutions together in a collectivistic manner would help their progress. The following quotes are direct student responses supporting our identified theme.

"I feel like if there are opposing viewpoints on personal efficacy, this would be the most difficult to resolve if we aren't doing well. We would need some sort of meeting with all of us to come to a conclusion about resolving our problem."

"I think communication will be a big factor in overcoming my hesitance to change. I think talking with the team and figuring out a system we can use to meet and get things done would solve a lot of problems that could come from these values."

"A strategy the team could use so the contrasting value orientations do not negatively influence our teamwork interactions is to have a team meeting to discuss and resolve potential issues. Also, strategies such as compromising on a disagreement or having an individual chat with a team member could work."

Topic	weight (most common)	Qualitative Analysis Theme
0	0.61481	indirect and direct communication
1	0.22602	progress and success
2	0.06724	Potential
3	0.10356	focus
4	0.15638	work and professionality
5	0.23519	Inevitability
6	0.41469	Expectations and Standards
7	1.44304	Harmony, Conflict, and Resolution

Fig.1. Participation 1 Fall 2021

The most common topic derived from student responses in the Spring 2022 semester, as shown in Figure 2 (topic 0), was related to team dynamics. The detailed theme interpreted for topic 0 was: Positive team dynamics help limit the negative effects of hierarchical structures that might form. In this way, the teammates can positively influence each other. The following quotes are direct student responses supporting the identified theme.

"During team interactions, it is important to understand the influence and knowledge of each member and spread the level of responsibility accordingly."

"Equality and Hierarchy are important in influencing teamwork interaction. It's either carrying the mindset of believing in people interacting with each other on equal terms while not using external differences (i.e., age or financial status) as a basis for interaction, or it's the opposite, and you believe in using those external differences as the basis of how one should interact with another."

"For activity/people, if my team is able to get along good and work together well, then it doesn't matter how much work we need to do because we will have fun doing it."

Topic	weight (most common)	Qualitative Analysis Theme
0	1.30207	Team Dynamics
1	0.44143	Change and Progress
2	0.356	Personal Values and Sentiment
3	1.21038	Indivdualism vs Collectivism
4	0.48091	Time Management
5	0.1314	Success
6	0.38052	Judgement
7	0.68716	Communication

Fig. 2. Participation 1 Spring 2022

VI. Discussion and Implications

As the first participation of the semester focused on reflecting on students' cultural backgrounds and how those backgrounds may influence their teamwork interactions, we

identified from the prominent topics that students realized that in a teamwork setting, team dynamics are crucial to the team experience. Specifically, students from both semesters believed that coming together and making decisions together in a collectivistic manner would help the progress of the team. This ties into team dynamics that ensure a positive interaction so that teammates can work to motivate, influence, and solve problems collectively. It was found that harmony and team dynamics are important in the role of teamwork within this study.

Findings from this study relate to those described by Bahrami et al. [5], who identified that by establishing rules and boundaries and enacting effective communication, students could improve their teamwork interactions, aligning with Theme 1. Furthermore, Bahrami et al. [5] also identified that students found that treating everyone equally, understanding others, and monitoring the progress of team members were useful strategies to implement, thus aligning with findings from Theme 2.

A. Implications for Teaching and Learning

This study implemented transformative pedagogy as a reflective approach to promote intercultural self-awareness. From the study, we can examine patterns of self-awareness in the context of cultural values through the analysis of reflections. Our findings suggest that transformative pedagogy guided students to be more aware of their own values and understand how their values play a role in their team working behaviors and how those may play out in their team dynamics. Creating an open and safe environment is needed to create a successful team, but it may be restricted depending on the organizational culture. Understanding others' ways of working is important, and transformative pedagogy helps promote students' self-awareness.

Understanding one another and being committed to the team are important to the success of teamwork. It is important for students to be open about their values and expectations and keep open communication throughout one's team working sessions. A common understanding is needed to help produce a more conducive collaborative environment.

A way to promote more positive interaction, as mentioned within our literature review, is to provide teamwork training and professional development. Teamwork training allows individuals to understand different ways teams may work, depending on team dynamics. Additionally, it allows individuals to get to know others on a more personal level, which helps bring about trust and openness. Professional development is also important as one needs to be self-aware of their own values and understand how their values influence their way of working and how it may influence the team as a result.

VII. Conclusion, Limitations, and Future Work

In conclusion, higher education institutions must form graduates with teamwork skills that also possess intercultural competence. With the ever-growing world of technology and globalization, it is imperative skill for students to understand how to work with others from all backgrounds. Intercultural pedagogy hopes to bring more awareness of students' own and others' cultural backgrounds when engaging in their teams. We find that there are common themes and values which students believe have contributed positively or negatively to their team-working experience. Patterns in students' self-

awareness regarding cultural values in the context of teamwork suggest that positive team dynamics, commitment to the team, and respect were major themes students believed helped create a successful team.

A limitation of our study is that the effectiveness of our proposed transformative pedagogical approach was only measured to identify students' cultural self-awareness. However, it is also necessary to investigate how that awareness played out throughout the semester as students engaged in collaborative work. Future research will aim to identify the effect of the reflective approach on students' actual interactions.

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