

## Reflective practice to bridge the theory-gap practice in Human-Computer interaction classes

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### **Abstract**

*There is a need to incorporate reflective practice in students' studies at higher education institutions to bridge the perceived theory-practice gap in Human-Computer Interaction classes. Reflective practice as an approach is employed for students to make connections between theory and practice. Reflective practice allows students to evaluate what they have learned through practice. The action research methodology was used to facilitate the research. All students who completed the assignment were invited to participate in the study, and since it was voluntary, 24 students took part. Using reflective sheets, the students were able to evaluate their current actions to improve in the future. Data were analyzed using conventional content analysis to interpret the data. The results indicated that the students were able to reflect on their work and new ideas they can incorporate into their future work. The relevance of reflective practice to bridge the theory-practice gap is highlighted.*

**Keywords:** *Reflective practice; theory-practice gap; higher education; Human-Computer interaction.*

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## **1. Introduction**

There is a common belief that there is a gap between the Human-Computer Interaction (HCI) theory and its application. The perceived theory-practice gap is also visible in HCI classes. Students are faced with the problem of a lack of time allocated for practical work to bridge the perceived theory-practice gap (Pittarello & Pellegrini, 2017). In HCI education, the usability and user experience of interactive systems and products are explored, understood, and improved (Abdelnour-Nocera, Michaelides, Austin, & Modi, 2012). Case studies are commonly used to teach students how to apply the theory they've learned (Collazos & Merchan, 2015). RP was identified as the best theory to guide the intervention needed to assist students to bridge the perceived theory-gap practice. In order to effectively assess what students have learned from practice, reflective practice is an essential component of reflective learning (Chaffey, de Leeuw, & Finnigan, 2012). The reflective practice process allows students to apply theory to practice (Colomer, Serra, Cañabate, & Bubnys, 2020).

Action research has been chosen as the suitable methodology to facilitate the process of RP. The purpose of AR is to improve the performance of lecturers and the learning experience of their students (Efron & Ravid, 2019). In order to improve current practices, AR process participants need to engage in self-reflection and question some interventions.

The aim of the present study was carried out to bridge the theory-practice gap by using RP in HCI classes. Data collected revealed that the use of RP is relevant for bridging the theory-gap practice.

## **2. Methodology**

Students enrolled in the second year of an IT program who have registered for the graphical user interface design module that focuses on Human-Computer Interaction participated in this study. They were given an assignment as part of the formative assessment. All students who completed the assignment were invited to participate in the study, but because participation was voluntary, only 24 students out of 183 participated. Participants completed a reflective sheet to reflect on their process during the completion of the assignment.

Action research (AR) is an orientation to knowledge creation that arises in the context of practice and requires researchers to work with practitioners (Huang, 2010). In its initial formulation, 'action research' was defined as a method that enabled theories produced by the social sciences to be applied in practice and tested based on their practical effectiveness (Carr, 2006). In this research context, students will be involved in projects that will enable them to learn by practising, in other words, they will be active participants who are going to apply theory in their practice. The five iterative phases of action research as illustrated in Figure 1

(Baskerville, 1999) are diagnosing, action planning, action taking, evaluating, and specifying learning.

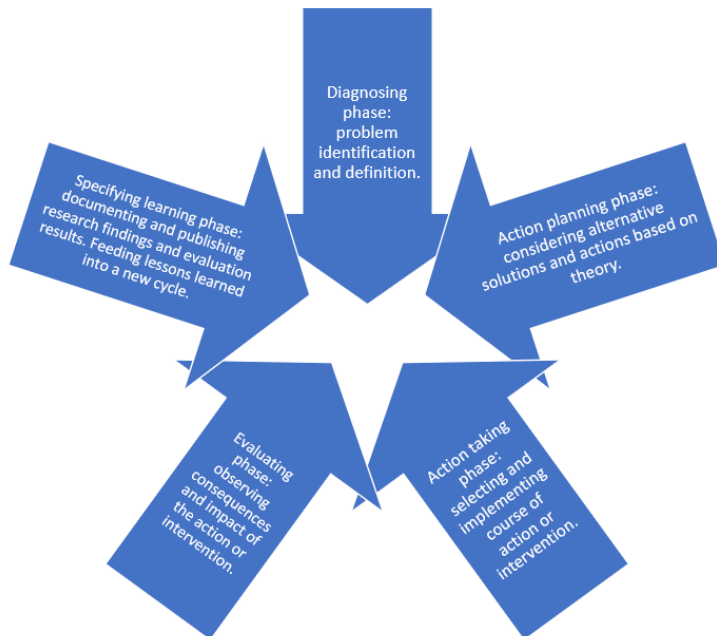


Figure 1: Action research process adapted from Baskerville (1999).

### **2.1. Diagnosis phase**

During the diagnosis phase, the lecturer/ researcher discovered that the students were making little use of theory when completing the practical work. The problem identified created some barriers for students to learn the design principles in order to apply them during their practical assignments. This also revealed that the students are unable to link the theory learned and the practical. The performance of the students on theory assessments was better as compared to the practical assessments. The students studied theory to pass the main assessments and practical assessments were only formative and no summative assessments were done. The problem identified from this stage will be used to plan the action that will be undertaken for the cycle.

### **2.2. Action planning phase**

In order to conduct an effective intervention, it was necessary to first identify and evaluate the problem. The intervention consists of a plan of action aimed to improve a participant's attitude toward improving their skills. The possible actions to assist with the problem identified in the diagnosis phase from the literature are presented in Table 1.

**Table 1: Possible interventions.**

<b>Recommendations from literature</b>	<b>Possible intervention</b>
Students complete a new task through hands-on experience (Konak, Clark, & Nasereddin, 2014).	Students will have to complete hands-on work as part of their assignment. Students will be required to do practical work as part of the assignment
Describe what went well and the problems they encountered, as well as where they will need to improve (Schultz, McEwen, & Griffiths, 2016).	The reflective sheet will incorporate the questions:  During the course of completing the assignment, ask the students what challenges they encountered,  Ask students how they solved the problems encountered,  Obtain their feedback on how they would improve their work if they had more time.
Assignment grading standards are developed properly (Roldan et al., 2020).	Students work will be evaluated based on the use of a rubric throughout grading.  The work should be communicated before it is submitted.
The reflection process follows after students completed their work (Konak et al., 2014).	Students are invited to reflect on the completed work  Participants will be asked to reflect after completing the work.  Each participant will be given a reflective sheet to complete.
The students attend the theory classes and practical classes thereafter. Using the diagnosis results, an action plan will be developed to alleviate the identified problem in order to develop students' skills.	

### 2.3. Action taking phase

During the action taking phase, the next step was to give students a practical assignment to complete as part of reflective practice. The summary of the actions taken based on the planning phase is presented in Table 2.

**Table 2: Interventions implemented.**

Recommendations from Literature	Interventions
Students complete a new task through hands-on experience (Konak et al., 2014).	<ul style="list-style-type: none"> <li>• Students completed hands-on work as part of their assignment.</li> <li>• Students were required to do practical work as part of the assignment</li> </ul>
Describe what went well and the problems they encountered, as well as where they will need to improve (Schultz et al., 2016).	<p>The reflective sheet incorporated the following questions:</p> <ul style="list-style-type: none"> <li>• During the course of completing the assignment, the students were asked what challenges they encountered,</li> <li>• students were asked how they solved the problems encountered,</li> <li>• Feedback was obtained on how they would improve their work if they had more time.</li> </ul>
Assignment grading standards are developed properly (Roldan et al., 2020).	<ul style="list-style-type: none"> <li>• Students' work was evaluated based on the use of a rubric throughout grading.</li> <li>• The work was communicated in class before it was submitted to clarify misunderstandings.</li> </ul>
The reflection process follows after students completed their work (Konak et al., 2014).	<ul style="list-style-type: none"> <li>• Students were invited to reflect on the completed work</li> <li>• Participants were asked to reflect after completing the work.</li> <li>• Each participant was given a reflective sheet to complete.</li> </ul>

## 2.4. Evaluation phase

The data were analyzed using conventional content analysis. Table 3 gives the summary of the process undertaken to analyze the data.

**Table 3: Content analysis process adapted from Zhang and Wildemuth (2009)**

Process	Application in this study
1. Preparing the data	The collected data was available in written form for use in Atlas.ti.
2. Defining the unit of analysis	Conventional content analysis was used.
3. Developing categories	Codes that contribute to the same meaning or context are categorized.
4. Testing the coding scheme on a sample	Data from four participants were coded.
5. Coding all the text	Coding each text entailed assigning a code to it.
6. Assessing consistency	Errors were thoroughly checked, and updates were made as needed by going over the coding twice.
7. Drawing conclusions from the data	The key categories have been identified and discussed.

## 2.5. Specify learning phase

Two categories derived from the data collected for this study will be discussed in this paper. The *challenging parts category* and *problem-solving category* are discussed:

### *Challenging parts category*

In accordance with the challenges encountered, participants highlighted the difficult aspects of the assignment that they encountered while completing it. The question was designed to determine whether or not the participants could analyze their progress and identify where they went wrong. The difficulties that the participants encountered were nearly identical because they involved understanding the assignment's requirements. Among the challenges listed were the following:

- problem with understanding the requirements;
- challenge with knowing what the banner is;
- difficulty with knowing where to start; and
- experiencing the work for the first time.

One of the most difficult aspects of reflective practice was revealing how participants acted when they first encountered the assignment. In this case, reflective practice aided in

determining those other students may be unprepared to complete an assignment. The results revealed that, in order to engage in reflective practice effectively, you must first thoroughly understand the assignment's requirements.

#### *Problem-solving category*

The problem-solving question sought to ascertain what the participants did to overcome the difficulties they encountered throughout the difficult sections of the assignment. The participants reflected on their actions as well as their coping strategies. These included asking questions, seeking additional assistance, and conducting Internet research. The following is a summary of actions taken:

- Using the internet and YouTube;
- Contacting the lecturer for clarification;
- Studying theory to understand;
- Finding answers in their study materials; and
- Carefully reading instructions.

Current and prospective students will be encouraged to learn the various strategies that will help them complete an assignment successfully. Students nowadays face information overload due to the abundance of information available on the internet, making it difficult for them to choose appropriate content for their assignments.

### **3. Discussion**

Participants were asked to identify the challenging parts they encountered while they were completing the assignment. The purpose of this question was to determine whether the work presented a challenge to the students. The findings indicate that when participants were completing the assignment, they encountered problems related to the processes and methods involved. Understanding what is required is crucial since it allows students to focus on the correct strategy when answering the questions. This statement is supported by Cerdán, Pérez, Vidal-Abarca, and Rouet (2019) who assert that students need to understand what they have been asked.

The goal of the problem-solving question was to find out how the participants overcame the challenges they mentioned. Participants were asked what steps they took to solve the problem. This allowed participants to reflect on the steps they took to overcome the problems they encountered. The participants stated that they solved the problems using the theory work. If students are unable to contact the lecturer, they should read the instructions several times to ensure that they understand the question.

#### 4. Conclusion

Students will be asked to watch the videos provided again before submitting their work to ensure that they understand the examples of work relevant to what they are required to complete in the future. In order to effectively complete their assignments, students will be encouraged to master a variety of strategies. This paper has revealed that it is possible to bridge the theory-practice gap in HCI classes by increasing student engagement and providing activities that encourage hands-on exploration and experimentation. It is essential to incorporate more interactive activities and discussions into classes so that students are able to gain a deeper understanding of the material as well as apply it to real-life situations. Furthermore, instructors should provide resources and activities that cater to the different learning styles of students. It is through these strategies that the students will be able to gain a deeper understanding of HCI theory and practice, resulting in a more successful academic experience. This paper has detailed how to bridge the theory-practice gap in HCI classes.

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