*International Journal on Recent and Innovation Trends in Computing and Communication*
*ISSN: 2321-8169 Volume: 11 Issue: 8s*
*DOI: https://doi.org/10.17762/ijritcc.v11i8s.7176*
***Article Received**: 20 April 2023 **Revised:** 06 June 2023 **Accepted:** 27 June 2023*

# Project Based Learning: Promoting Cross-Cultural Understanding using Android Application at an Indian University in Gujarat

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***Abstract*—**Students in a project-based learning environment get experience with actual, hands-on projects. In this article, we present the experience obtained in a Mobile Application Development course. In addition, available multi-country criteria of this research enable us to investigate probable cross-cultural variances. The purpose of this project was to design and create apps (or simply app) for Android-based devices. The chosen methodology, based on Project-Based Learning, boosted both cooperation and rivalry among students. This research offers the outcomes from a heuristic assessment by students at Indian university in Gujarat for the students of three nations. Total 120 students are recruited for this research from a university in Gujarat. "It was established that a project-based learning approach is an effective and engaging way for translation students to experiment with their translation skills and different translation theories, achieve linguistic and cross-cultural understanding of different cultures while participating actively in various organised learning activities." More significantly, they have elevated their intercultural awareness and strengthened their intercultural communication ability. As students engage in this kind of project-based, introspective, and exploratory learning, they grow in their confidence as communicators (both verbally and in writing), their willingness to take intellectual risks, and their awareness of cultural variety. Its educational ramifications are examined.

**Keywords**- Cross-culture, Project, Students, Learning, Android, Diversity.

## I. INTRODUCTION

In 2016, seven billion people are predicted to be using some kind of mobile cellular network. In addition, 3.2 billion people are estimated to be online at any one time. Improvements in accessibility, conversation, and teamwork are just a few examples of how mobile technology are altering our everyday routines. The use of mobile technology (particularly smartphones and tablets) in the classroom has the potential to significantly alter traditional pedagogical practises. It is clear that mobile learning is not a replacement for traditional schooling, but rather a complement that facilitates education in non-traditional settings and provides benefits for a variety of interactions (Sharples, Taylor & Vavoula, 2010). Through the 2010s, smartphone adoption skyrocketed throughout the world. Almost half of the world's population will have their own smartphone by 2020, and that number is only projected to grow.

Furthermore, technological development is altering the educational setting. The more traditional, teacher-centered style of teaching is progressively giving way to one that is more student-centered. The phrase 'Smart Learning Environments' was coined to describe the emerging paradigm in education that integrates dynamic teaching strategies, cutting-edge tools, and cutting-edge physical spaces.

## II. CONCEPT OF PROJECT-BASED LEARNING

The concept of project-based learning, also known as problem-based learning, was developed at McMaster University in Canada in 1968, at the University of Roskilde in 1972, and at the University of Aalborg in Denmark in 1974. The PBL approach has students work in teams to find solutions to open-ended issues that have been carefully chosen to support the program's learning goals. Learning is more student-centered since students must rely heavily on their own initiative to acquire what they need to know in order to solve the problems they face. Students have the opportunity to take charge of their education and learn by doing as they solve difficulties. Traditional teaching and supporting infrastructure like as study halls, smart classrooms, libraries, and labs with state-of-the-art equipment all help students learn more and become better problem solvers. "Given that each student will find it difficult to tackle a challenge on their own, PBL requires pupils to work in groups of four to five. In turn, this promotes education

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amongst peers." There is empirical evidence that shows that using PBL leads to both deeper learning and higher performance on standard and project-based assessments. Student employability is boosted as a result of PBL as well, since students acquire more skills.

Students are more likely to actively participate in solving a real-world issue when a project-based learning method is used in the classroom. Student serves as consultant to design a commercial firm logo, for instance, rather than learning to develop graphic using computer software from a tutorial book. Via the use of a problem-based learning paradigm, students are 'directed' to the subject's central idea through the use of a project. Students should be actively engaged in the investigative, deliberative, and resolving processes required by the project. Certain activities, such as basic instructions and practise using 'previously -learned knowledge,' fail to meet the requirement of project-based learning, however, since they do not provide the same level of challenge as project-based teaching. Using a project-based approach to education encourages more independence on the part of students. For instance, they are accountable for the decisions they made and the ways in which they addressed the issues they encountered. The term 'realism' is used to describe the nature of the project, which should be grounded in reality, with pupils facing genuine challenges in the areas addressed.

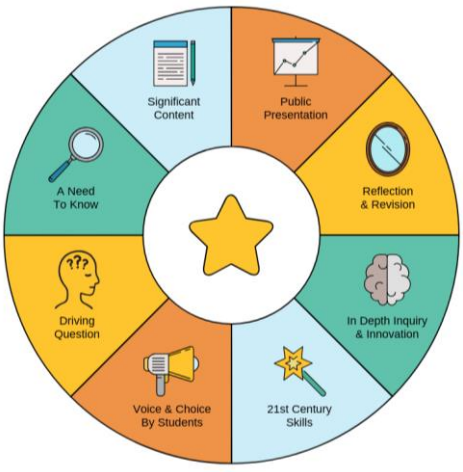


Figure 1: Elements of Project Based Learning

Project work, as described by Kwok and Tan6, is a complicated cognitive and metacognitive process that needs both 'hands-on' and 'minds-on' instruction. As they characterise project-based learning as an action-oriented activity with an emphasis on doing rather than learning on, they conclude that it is a medium for higher order learning and that sophisticated cognitive processes are really necessary in project work. The session lasts for a certain amount of time, during which time pupils engage in an activity that yields a measurable outcome. When well-planned and executed, combining project-based learning with computer simulation modelling produces positive results. It is the responsibility of educators to determine how pupils might benefit from technologically enhanced learning materials. According to research by Eskrootchi and Oskrochi (2010), students benefit most from learning when they use technology to facilitate the construction of knowledge via the sharing of their own experiences, interpretations, and interactions with teachers and classmates. Additionally, Tseng et al. investigated students' perspectives on using projects to study STEM subjects at one Taiwanese university. They found that students' views about their education and their future employment might be influenced by a shift to a more project-based learning environment.

## III. SCENARIO OF PROJECT BASED LEARNING IN INDIAN INSTITUTES

It's worth noting that PBL as a technique has its roots in Europe, a continent whose culture is very different from that of India. Furthermore, the Indian educational system does not have a foundation for project-based learning. Surprisingly, hardly a single university is using PBL to its utmost potential. It's possible that this is due to a lack of PBL-capable staff at these institutions. "Another issue is that not enough is known about the PBL concept; for instance, most teachers consider conducting projects to be PBL, while in reality it is not." Therefore, Educator Training in PBL Theory and Methodology is Required. Staff members will become more aware of PBL practise after receiving such training. Staff members who have been exposed to the principles of PBL may then use this knowledge to create a variety of PBL models that are unique to the Institute's pedagogical ethos. As a result, the PBL framework will be maintained while the actual implementation is adapted to the local context.

After models have been produced, they must be put into practise inside the institution; this is known as PBL practise, and instructors who engage in it are known as PBL practitioners. Research on the impact of PBL is launched because it is crucial to monitor the program's effect on students' knowledge and abilities both during and after its implementation. The educator who leads this kind of investigation is known as a 'PBL researcher.' Therefore, research provides a means of considering both successes and failures. And with each iteration, the PBL models and methods improve. We anticipate that the Institute will be able to maintain PBL practise on their own after sufficient PBL practise and research have been conducted. While we know from experience that two cycles of PBL practise and research may develop a culture, we also know that maintaining that culture is more difficult. To counter this, we seek for educators who have implemented and studied PBL

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with a positive frame of mind and label them as PBL trainers. These selected educators then have an ongoing role in the institute's PBL guidance and upkeep.

Students are the primary end-users of PBL, making student counselling for PBL crucial. Our group will teach personnel and provide guidance to kids to help them implement PBL. Our team will discover initiatives developed by staff and students during PBL practise that have the potential to be patented, published, or developed into a start-up. A further round of instruction in business modelling, patenting, and publishing will be provided to the aforementioned individuals, groups, and projects. Over the course of a school year, the same cycle will be repeated again. At each point of both cycles, the Institute must compile documentation in preparation for accreditation. We want to begin training on developing collaborative bids for European Union programmes when the first cycle is completed successfully. The administration and faculty of the institution must make a decision, indicating their level of dedication to the project at hand. To help you reach the goals you defined on the previous page, we've included a graphs below.

## IV. CROSS-CULTURAL CHALLENGES FOR SUBCONTINENT STUDENTS

As a result of their cultural differences, students from each subcontinent encounter a unique set of difficulties in the classroom. Language barriers are a major issue that has been discussed extensively in the literature on foreign students. This is in accordance with recent research (Newton et al., 2021). The research reveals that students themselves see language difficulties as their greatest hurdle, which may lead to problems like plagiarism, misunderstanding of learning and teaching techniques, and incorrect interpretation of course materials (Bird, 2017). International students, even if they speak the language well, may still find it difficult to learn from their teachers when they employ local examples and case studies.

Students studying abroad have a substantial cultural hurdle due to the 'gap' between their expectations and reality due to variations in teaching and learning approaches between their home and host countries (Sakurai et al., 2016). The majority of Indian universities adhere to a learner-centered, in-depth pedagogy that places a premium on students' initiative, self-directed research, and open dialogue with their instructors. This is in sharp contrast to the educational practises prevalent in many nations of the Indian subcontinent, where students are expected to blindly accept the authority of their teachers and are discouraged from asking questions about the material they are being taught. Students from these schools tend to be passive in the classroom, relying instead on rote memorization and recitation of teacher-provided material. Students in collectivist societies, such as India's, are also more likely to avoid argument and disagreement with their peers for fear of social disapproval.

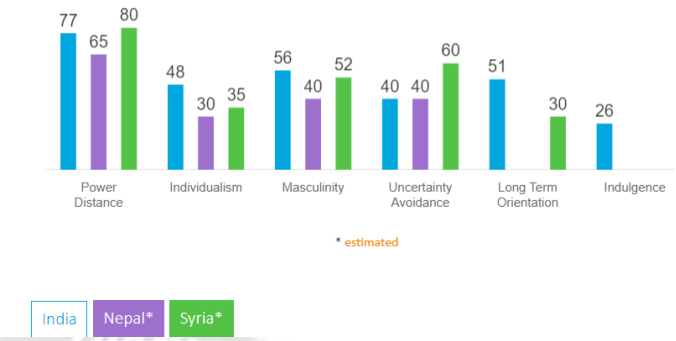


Figure 2: Comparison between India, Nepal and Syria

Collective thinking also affects overseas students by encouraging them to seek out personal and academic support via networks of contacts. The latter is risky since it may inspire unethical assessment cooperation. Students from collectivist nations, who were previously permitted and even encouraged to work together, are typically unprepared to deal with this kind of academic set-up.

## V. CONSIDERATION WHILE DEVELOPING APPLICATION RELATED TO CROSS- CULTURE

It stands to reason that if your target demographic extends across nations and cultures, you should adapt the app so that users in each locale feel like it was made just for them. "And you can't simply change the app's language to do that." It's no secret that our cultural backgrounds have a significant impact on how we behave and interact online. Customers' first impressions of your app, their level of confidence in it, and the factors that ultimately convince them to make a purchase are all culturally relative. That's why it's very crucial that you localise your app for each and every culture, location, and nation you plan on promoting it in.

- Take Custom Images for Each Country and Culture
- Localize Your Copy
- Design for Different Devices and Networks
- Searching Vs Browsing
- Pay Attention to Cultural Nuances and Nail Your User Research

Having dedicated users is crucial to the success of any app. Emotions are the source of all loyalty. All of your users' feelings should be taken into account throughout the design process, because our feelings are inextricably bound to our nationality, geographical location, and cultural background. That's why it's important to tailor your app to users of various cultural backgrounds if you're aiming for a global or multi-cultural audience. The preceding advice will get you started on the path

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toward making your app suitable for users in a wide variety of countries and cultures. Thereafter, you may provide as much or as little customization as you want to increase user involvement across the board and make your app a global phenomenon.

## VI. PROPOSED METHODOLOGY

### Participants

Sixty students from the University of Gujarat's control group, sixty students from the experimental group, and forty students from India, Nepal, and Syria are chosen at random. The student ID numbers were used to divide the students into two groups: those with odd numbers were included in the experimental group, while those with even numbers were placed in the control group. There was a median age of 21.

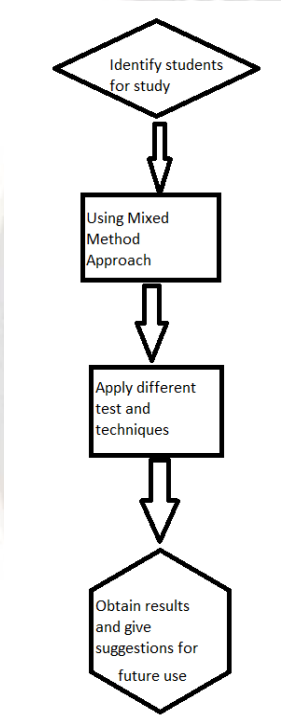


Figure 3: Proposed flowchart for study

### Research Design

In this research, we employed a mixed design that included both quantitative and qualitative data, as well as a pre- and post-test design with experimental and control groups. Just the 'programming accomplishment test' was used before we started the experiment. The courses in the control group were taught in the standard fashion, whereas those in the experimental group were taught using a project-based learning strategy in a hybrid setting. "The 'programming accomplishment' exam was used as a post-test after the trial application had concluded." In addition, semi-structured interviews were performed with students in the experimental group after the procedures were completed.

The experimental and control groups' starting points were determined by administering the course's final accomplishment exam before they started the course. The students in each cohort should perform similarly academically. Table 1 displays the results of an independent t-test performed on the student pre-tests.

| Groups | N | X | S | sd | T | p |
|---|---|---|---|---|---|---|
| Experiment | 60 | 39.04 | 17.3 | 70 | .641 | .563 |
| Control | 60 | 39.51 | 11.02 | | | |

Table 1: Pre-test scores of experiments and control groups

The survey questions were developed using both the results of the literature study and the researchers' own prior knowledge and expertise in the field. We asked participants to rate their level of interest in participating in this study's cross-cultural collaboration (6 questions), their level of interest in participating in future cross-cultural communications (2 questions), their future willingness to communicate in an international context (2 questions), and their interest in using the developed android app (4 questions).

The students used a five-point scale similar to the popular Likert system, whose responses ranged from 'Strongly Disagree' (#1) to 'Strongly Agree' (#5). The SPSS statistical programme was used to conduct in-depth analyses, including descriptive statistics and Multiple Regression Analysis, on the coded responses.

## VII. RESULT AND DISCUSSION

After the research, the produced projects were downloaded to cellphones for evaluation (see figure 3.). Students in the control group were given access to the project's study schedule, milestones, and data collection points using the Moodle online learning platform. Furthermore, it was expected that students would take an active role in the teachings by contributing to the class debates; it was during these conversations that students' misunderstandings would be addressed and remedied.

The 'mobile application development accomplishment exam' was administered at the conclusion of the study as a post-test to compare the performance of students in the PBL-trained experimental group with the performance of students in the control group. Separate t-testing was also done.

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| Groups | N | X | S | SD | T | p |
|---|---|---|---|---|---|---|
| Experiment | 60 | 71.56 | 15.6 | 76 | -3.552 | .000 |
| Control | 60 | 64.54 | 11.33 | | | |

Table 2. Achievement test results of the experimental and control groups

As can be shown in Table 2, the experimental group educated using a project-based learning strategy assisted by online settings outperforms the control group taught using conventional techniques. Though both groups saw success rise, the rise in the experimental group was statistically significant (t= - 3.552, p0.05). This conclusion suggests that the project-based learning model, bolstered by online settings, has a more beneficial effect than the conventional method of instruction when it comes to the delivery of the mobile application development curriculum.

Five different areas of inquiry were probed via the participant's responses to survey questions. Cronbach's alpha was 0.84 (Cronbach's alpha=.84), indicating excellent question-to-question consistency, based on a pilot test of the scale. In Table 3, we see descriptive statistics for each question, as well as averages and standard deviations for the five components.

| **Items** | **M** | **SD** |
|---|---|---|
| Construct (A) Perception of willingness to communicate in this study | 3.40 | .85 |
| I enjoyed the experience of working with my partners of another culture. | 3.33 | 1.08 |
| I was active in contacting my partners of another culture. | 3.48 | 1.12 |
| Construct (B) Perception of cross-cultural collaboration effectiveness/success in this study | 3.81 | .54 |
| My partners of another culture were very cooperative. | 4.00 | .93 |
| My partners of another culture and I were able to solve our problems. | 3.67 | .89 |
| The interaction in this cross-cultural collaboration was successful. | 3.73 | .71 |
| The collaboration in this cross-cultural activity was effective. | 3.79 | .85 |
| I learned valuable skills for how to work well with people of another culture. | 3.88 | .82 |
| I was able to develop a better understanding of my partners from another culture. | 3.82 | .68 |
| Construct (C) Future Willingness to communicate in an international context | 4.03 | .74 |
| The collaboration skills gained from this experience would help me interacting with people of different cultures in the future. | 4.03 | .84 |
| I become more interested in getting to talk to people of different cultural backgrounds after this experience. | 4.03 | .77 |
| Construct (D) Perception of using Android App in this study | 3.61 | .54 |
| I have encountered problems in the communication through developed Android App. | 3.91 | .84 |
| My partners of another culture and I were able to solve our problems through developed Android App. | 3.24 | 1.17 |
| Instant Message sent via developed app was helpful in my cross-cultural communication. | 3.64 | .82 |

Table 3. Descriptive statistics of all questions

Participants were most likely to agree that 'My partners of another culture were very cooperative' (M=4.00), followed by 'The collaboration skills I gained from this experience would help me interacting with people of different cultures in the future' (M=4.03), and 'I become more interested in getting to talk to people of different cultural backgrounds after this experience' (M=4.03).

For them, 'My companions of different culture and I were able to address our difficulties via produced Android App' received the lowest degree of agreement. As the only question to obtain a mean on the Disagree side of the Likert scale, this one stands out (M=3.24).

The participants were most likely to agree with the construct (C) about their intention to communicate in a global setting in the future (M=4.03).

Using Multiple Regression Analysis, displayed in Table 4 (R2=60%), we analysed the students' desire for future cross-cultural dialogue and how it was impacted by other factors. Results showed that the construct 'future willingness to communicate in an international context by using developed Android App' was predicted by 'willingness to communicate in this study' (ß=.599, p<.01), and by 'perception of cross-cultural collaboration effectiveness/success in this study' (ß=.281, p<.05).

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| Independent variables | Dependent variable Future willingness to communicate in an international context by using developed Android App | | | |
|---|---|---|---|---|
| | B | SE B | ß | Sig. |
| Willingness to communicate in this study (A) | .822 | .185 | .599 | .000** |
| Perception of cross-cultural collaboration effectiveness/success in this study (B) | .381 | .184 | .281 | .047* |
| R= .791, R2= .620, Adjusted R2=.595 | | | | |

Table 4: Summary of multiple regression analysis for 'future willingness to communicate in an international context by using developed Android App'

Note. Reported regression coefficients reach significance level at p<.05*, p<.01**, two-tailed.

## I. CONCLUSION

The conventional educational environment is moving to a more pro-active and collaborative one. In this case, teachers also need to change themselves in order to better aid students during the learning process. This essay provides a case study that reflects this new tendency. We delivered results from a mobile application development course that took use of a contemporary atmosphere, new technology, and a pro-active teaching technique. "It is predicted that this research undertaken using a technology-supported project-based learning strategy would add to the literature." A well- conceived technology-supported PBL approach is predicted to have a favorable influence on mobile application development projects. Additionally, possibilities for further growth via the project-based learning method may be offered while working with mobile application developers. The study concludes by recommending that the project-based learning approach facilitated by technology in this research be tried out on other classes.

Thus, this study enabled to assess the efficacy of an integrated strategy based on project-based learning. In addition, this study may serve as a guide for the construction of a pedagogical framework for the instruction of mobile application development, with the end goal of facilitating the selection of effective learning strategies.

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