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Student Experiences with Project-Based Learning in Agile Project Management: Evidence from Undergraduate Computing Education in Nepal

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Abstract

Project-based learning (PBL) is increasingly embedded in higher education to develop practical skills in agile project management, which relies on the principles of iterative and collaborative approaches. Nevertheless, the experiences of students in this type of setting have not been adequately examined in places such as colleges in Nepal. A convenience sample of 102 students was used in a descriptive cross-sectional study design. A standardized questionnaire based on literature was used to quantify the benefits, challenges, and skills acquired using a five-point Likert scale. Descriptive and inferential statistics (chi-square test) were used in SPSS version 20 to analyze the data. More than two-thirds of respondents (68.6%) experienced a positive impact. Slightly more than half (52.9%) faced moderate challenges, and (64.7%) reported high skill gain. Statistically significant associations were found between impact and age, and between skills gained and gender. Most students perceived positive impacts and skill gains from PBL in agile education, with manageable challenges. These results highlight the necessity of the design of specific interventions to improve experiences, especially in younger students and females. These results provide educators with creating agile-integrated curricula in higher education computing programs.

Keywords: *Agile Project Management, Higher Education, Project-Based Learning, Skill Development, Student Experiences.*

1 Introduction

Agile project management is an iterative methodology that focuses on flexibility, collaboration and customer feedback in contrast to the traditional one as it allows flexibility in planning and early delivery (Halani, 2022). Educational uses of Agile are being seen worldwide, especially in fields like computer science and information systems where it is being adopted in classes to teach future professionals how to adapt to the changes that happen in the industry (Neumann & Baumann, 2021). Some agile models used in schools in Europe and the United States, for example Scrum, can be characterised as a simulation of the experience of building software in the industry with early delivery and the use of iterative planning (Neumann & Baumann, 2021).

Project-Based Learning (PBL) is another pedagogical strategy that uses the acquisition of knowledge through the inquiry of real-world projects (Mutanga, 2024). Students participate in productive discussions and collective efforts to acquire new knowledge and develop the skills necessary to solve industry-related problems. Research has demonstrated that when used in conjunction with agile methodologies, PBL increases the level of student proficiency in applying knowledge, enhances the level of student engagement, builds both technical and interpersonal skills, increases student's academic success, and decreases the rate of student dropouts (Donelan & Kear, 2023).

Despite the global acceptance of project-based learning, few student-based studies exist regarding student perceptions on learning outcomes in agile integrated educational settings across the South Asian region (i.e., South Asia). Existing research on agile project-based learning primarily comes from Western or European institutions; therefore, there is a lack of regional research regarding students' experiences and evaluations of agile project-based learning in developing countries. Differences in institutional resources, pedagogical practices and cultural contexts between developed and developing nations could affect students' experiences with agile project-based learning; therefore, more localised evidence is needed to inform curriculum development and to implement effective pedagogy.

In Nepalese institutions such as Itahari International College, agile models are integrated into undergraduate programme where students engage in capstone projects using PBL approaches (Palová & Vejačka, 2023). However, students experience challenges such as excessive workloads, programming skill gaps, time constraints, and collaboration difficulties. Despite growing adoption, localised research exploring student experiences in agile PBL education in Nepal remains limited. Therefore, this study aims to assess student experiences, including positive impacts, issues faced, and skill gained, to support evidence-based improvements in agile project management education and inform curriculum design in similar higher education contexts.

2 Methods

A descriptive cross-sectional study design was used for this study. The research was conducted at Itahari International College situated in Sundar Haraicha–04, Morang district, located in Koshi Province. The participants were undergraduate students enrolled at Itahari International College who were studying courses that incorporated agile project management. The study involved a total of 102 students. The selected students were aged 18 years and above. Exclusion criteria included students below 18 years, those not enrolled in agile project management courses, and those who did not provide consent to participate. A non-probability convenience sampling method was employed, and the sample size of 102 was determined based on the accessible study population.

A structured questionnaire was built on research literature and was used to collect data in the form of 30 items with a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). The questionnaire measured positive impacts (10 items), challenges (10 items), and skills gained (10 items) of involvement in agile project management. The instrument is based on adapted scales (Strobel & Van Barneveld, 2009). Content validity was established through expert review from professional faculty members in project management, and reliability was tested using Cronbach's alpha (>0.7) during pretesting on 10% of a similar population (Marnewick, 2023).

The approval was also given by the Itahari International College research committee regarding ethical issues. Participants consented to participate, anonymity, confidentiality, and withdrawal were assured in writing. Data was collected during 2 weeks between 6th November and 22nd November 2025 using self-administered questionnaires that were administered during classes. Data was analysed using IBM SPSS Statistics Version

20. The summarization of the experiences in terms of frequency, percentage, mean, and standard deviation employed descriptive statistics (frequency, percentage, mean, standard deviation), whereas the test of association (chi-square test) with respect to the variables at $p<0.05$ was conducted using inferential statistics. The researcher personally entered, edited, coded, and validated data and presented it in a tabular format. Research findings were disseminated through a seminar presentation.

3 Results

Table 1: Background information of students

n=102

Variables	Frequency(N)	Percent (%)
Age		
18-20	41	40.2
20-22	43	42.2
23-25	18	17.6
Mean ±Std= 1.77 ±0.73		
Gender		
Male	54	52.9
Female	48	47.1
Program Enrolled		
BSc (Hons) Computing	102	100.0
Year of study		
Year 2	60	58.8
Year 3	42	41.2

Table 1 describes the background of the students. The age brackets indicated that most of the students were aged 20-22 years (42.2%), then there were 18-20 years students (40.2%) and 17.6% were aged 23-25 years. The average age of the respondents was 1.77 ± 0.73 which means that the majority of the respondents are young undergraduate students. On gender, the result was almost equal with 52.9% male and 47.1% female students, indicating that both genders participated equally. All the respondents (100%) were pursuing BSc (Hons) Computing programme. Concerning academic year, 58.8% of students were from Year 2, while 41.2% were from Year 3, indicating slightly higher participation from second-year students.

Table 2. Impact on students

n =102

Impact	Frequency(N)	Percent (%)
Neutral impact	32	31.4
Positive impact	70	68.6
Mean±std= 1.69±0.46		

Table 2 shows the level of impact among students. More than two-thirds of the respondents (68.6%) experienced a positive impact, whereas 31.4% reported a neutral impact. The average score of impact was 1.69 ± 0.46 which shows that in general students had a good experience. This result indicates that most

students were positively impacted by the exposure or intervention under test, and positive responses were even more than neutral responses.

Table 3: Challenges among students

n =102

Challenges	Frequency(N)	Percent (%)
Low challenges	48	47.1
Moderate challenges	54	52.9
Mean±std= 1.53±0.53		

Table 3 presents the challenges encountered by students. Moderate challenges were experienced by slightly more than half of the respondents (52.9%) and low challenges were experienced by 47.1%. The mean challenge score was 1.53 ± 0.53, indicating that although challenges were present, they were generally manageable. This outcome indicates that the students did not face extreme problems, yet there are no major challenges prevalent among the members of the research group.

Table 4: Skill gained by students

n=102

Skills	Frequency	Percent
Moderate skill gained	36	35.3
High skill gained	66	64.7
Mean±std=1.65 ±0.48		

Table 4 illustrates the level of skills gained by students. Most of the respondents (64.7%) had high skill gain and 35.3% had moderate skill gain. The average score of the skills was 1.65 ± 0.48, demonstrating that most students perceived substantial improvement in their skills. These findings indicate that the learning or experiential process was effective in enhancing student's skills.

Table 5. Association between the impact with background variables

n=102

Variables	Neutral impact (%)	Positive impact (%)	Chi-square(χ^2)	p-value
Age				
18-20	15(36.6)	26(63.4)	10.077	0.006**
20-22	17(39.5)	26(60.5)		
23-25	0	18 (100)		
Gender				
Male	17 (31.5)	37(68.5)	0.008	0.98
Female	15(31.3)	33(68.7)		
Year of study				
Year 2	23(38.3)	37(61.7)	3.379	0.70
Year 3	9 (21.4)	33(78.6)		

Note: Statistical significance was determined at p ≤ .05. ** Indicates a statistically significant association.

Table 5 demonstrates the relationship between impact and background variables of choice. The association between age and impact was statistically significant (χ^2 = 10.077, p = 0.006), which means that the degree of impact difference among different age groups was statistically significant. The positive impact was found to be 100% among the students aged 23-25 years, and the other age groups were found to have a neutral or positive impact. Nonetheless, there was no statistically significant association between the variables of gender and impact (p = 0.98) or year of study, and impact (p = 0.70). This suggests that impact was independent of gender and academic year.

Table 6: Association between the challenges with background variables

n=102

Variables	Low challenges (%)	Moderate challenges (%)	Chi-square(χ^2)	p-value
Age				
18-20	18(43.9)	23(56.1)	0.691	0.708
20-22	20(46.5)	23(53.5)		
23-25	10(55.6)	8(44.4)		
Gender				
Male	27(50)	27(50)	0.398	0.528
Female	21(43.8)	27(56.2)		
Year of study				
Year 2	26(43.3)	34(56.7)	0.812	0.368
Year 3	22(52.4)	20(47.6)		

Note: Statistical significance was determined at p ≤ .05.

Table 6 shows the association between issues and the chosen background variables. The analysis indicates that there is no statistically significant association between age and the challenges (p = 0.708) or gender and the challenges (p = 0.528). It means that the degree of difficulty among the students was the same regardless of the age of participants and regardless of male and female students.

Table 7: Association between the skills gained by students with background variables

n=102

Variables	Moderate skill gained (%)	High skill gained (%)	Chi-square(χ^2)	p-value
Age				
18-20	12(29.3)	29(70.7)	2.586	0.274
20-22	19(44.2)	24(55.8)		
23-25	5(27.8)	13(72.2)		
Gender				
Male	14(25.9)	40(74.1)	4.410	0.036**
Female	22(45.8)	26(54.2)		
Year of study				
Year 2	20(33.3)	40(66.7)	0.245	0.620
Year 3	16(38.1)	26(61.9)		

Note: Statistical significance was determined at p ≤ .05.

Table 7 presents the association between the background variables of the students and the skills acquired. The age and skills gained association was not found to be significant ($\chi^2 = 2.586$, $p = 0.274$), indicating that skill gain did not differ significantly across age groups. A statistically significant association was found between gender and skills gained ($\chi^2 = 4.410$, $p = 0.036$). A greater percentage (74.1%) of male students indicated high skill gain as opposed to female students (54.2%). The association between the year of study and the skills acquired was not found to be statistically significant ($\chi^2 = 0.245$, $p = 0.620$), and this indicated that there was no difference in skills gained between Year 2 and Year 3 students.

4 Discussion

This study assessed the experiences of undergraduate students in project-based learning (PBL) within agile project management education at Itahari International College. The findings suggest that PBL provides a positive learning experience and supports the development of practical competencies required in agile environments. Students found the agile-integrated PBL generally advantageous for comprehension of concepts in project management and for application of theory to real-world situations. The results are like those of past research discovery that project-based learning methods led to better project engagement, collaboration and understanding of agile principles (Mutanga, 2024).

While there were a few students who faced challenges in communicating and collaborating with members of their team, coordinating, and determining roles, these issues generally were not severe enough to diminish the overall effectiveness of learning. The results of Paez's study also showed that students struggled in the beginning to collaborate properly as a team, but over time they learned to improve their team effectiveness and project organization (Paez, 2017). Hence, this can be seen as evidence that agile project-based learning could potentially create complexity in learning but also provide beneficial learning experiences (Fernandes et al., 2021).

The results also showed that pupils acquired valuable technical and transferable skills, such as working collaboratively, communicating, problem solving, flexibility and agile project management skills. The findings in this study are consistent with the prior studies that show that project-based learning is effective to equip students with technical and non-technical skills capable of implementing in the industry (Rohm et al., 2021). The agile and practical approach to projects seems to make it easier for meaningful learning and experiential learning to take place (Strobel & Van Barneveld, 2009).

Additionally, age was identified to be significantly associated with perceived impact, indicating that maturity of students might have some effect on their learning experiences in agile project settings. A strong relationship was also found between gender and the skills acquired. This study does not seek to describe the causes but does indicate the need to support inclusive learning environments to ensure equal opportunities for participation, leadership and skill development. Special attention should be paid to ways in which educators can encourage all students to achieve equitable learning outcomes, including through assigning students structured roles within a team, reflective activities and mechanisms for peer feedback.

Overall, the findings reinforce the value of integrating agile methodologies with project-based learning in higher education and support its continued use in computing and project management programmes.

5 Conclusion

The results of the study demonstrate that the use of agile project management to support a project-based learning approach had a positive impact on undergraduate students' learning experiences. Most student

survey respondents indicated that they experienced positive educational outcomes as well as manageable difficulties and substantial skills development and therefore concluded that students generally perceived agile project-based learning to be beneficial.

In addition, the findings indicate that the implementation of an agile project-based learning approach positively influences both technical and transferable skills which include collaboration, communication, adaptability and problem-solving. These results are consistent with the increasing focus on designing curricula that are oriented toward practice and prepare students for today's workplace.

The significant statistical relationship indicated between the perceived improvement in skills and gender emphasises the need for an inclusive curriculum design and equitable participation strategies. Educators need to provide students with structured reflection, balance in roles within teams, and a supportive approach to team-learning to ensure that all students can equally benefit from the agile learning environment.

This study provides local evidence regarding higher education in Nepal that will support the ongoing implementation of agile project-based learning in Computing programmes. The implications of the research results can be applied in curriculum design, teaching practice, and future research into project- and experience-based learning.

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