Project Based Learning

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IIBIT

Introduction

- This presentation is based on our experience while delivering the master and bachelor project courses

- Master and bachelor project courses are two of the most popular courses among the students

- Both courses have very good completion rate

- These courses are capstone courses for master and bachelor programs

- Projects are team based and follows an agile project management approach

- Projects are real-world projects, but minor adjustments are made to satisfy the academic requirements

Content

- What is Project-based Learning

- The process

- Our Approach

- Monitoring of Project Progress

- How close to Industry

- Challenges and Gaps

- Application Project Based Learning

- Survey and Feedback

- Conclusion

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What is Project Based Learning

- 'The presumption is that students need opportunities to construct knowledge by solving real problems through asking and refining questions, designing and conducting investigations, gathering, analysing, and interpreting information and data, drawing conclusions, and reporting findings' - Blumenfeld, Fishman, Krajcik, Marx and Soloway (2000)

- This learning emphasizes Problem-based self-learning and research

- Involves role-based participation – Students assume multiple roles such as business analyst, developer while doing project

- Research component helps them in exploring different solutions rather than sticking to one known solution

- Continuous feedback from client, supervisor, lecturer/tutor enables them to understand, evaluate and maintain the right track

The process

- Teams are formed and projects are allocated based on the skill sets

- Follows an agile approach

- Weekly client and supervisor meetings

- Weekly lecturers and tutorials provide additional resources and support

- Assessments tasks consist of sprint demonstrations and technical documentation

- Final presentation – Show case the final product and comprehensive documentation with research component

Our Approach

- Form teams before semester starts

- Form the teams based on skill sets

- Source projects from industry

- Adjust the requirements for the project to meet the course requirements

- Release the projects to the students before enrollments

- Project conception, execution and final report (elaborated in the next slide)

- Identify the strugglers early and provide support

- Constantly monitor groups and regularly meet with the supervisors

Project Progress

- They understand the problem (requirements) asking and refining questions

- They Design and conduct investigations (research)

- Gather data, tools, techniques, theories and methodologies based on knowledge gained in the previous semesters

- Analyse and interpret and create solutions and provide reports and presentations.

How close to industry

- Students have to understand the project by reading the documents and conducting interviews with the client

- Requirements are elicited (not given) through interactions

- Requirements are dynamic (change management is practiced)

- Students take the roles such as Team lead, Business Analyst, Developer and fulfill the responsibilities

- They decide what tools, techniques, languages to use to implement

- Learn the required skills (programming languages, tools..) as demanded by the project (not by curriculum)

- Many students have learnt a lot more skills in a project than in regular course

Challenges and Gaps

- **Monitoring daily basis not possible (compared to industry)**

- Incorporating design aspects is difficult as the sprints demand outcome of user stories

- Sometimes students spend more time in learning tools/languages to execute the project

- Groups may not be balanced

- No replacement/substitution when a group member is unable/unwilling to participate

- Sourcing Data Analytics projects are challenging as industries don't want to share their data

Application of Project Based Learning

- Could be difficult to apply project-based learning for some courses due to the nature of the course.

- However, assessments can be modified to include a mini project or case study to be completed throughout the course.

- This can be in form of project with two parts and final exam questions can be based on the project design and execution.

- As an example, Software Engineering Analysis and Design course can have 2 assignments and a final exam based on a software development project where assignment 1 covers the software design aspects, assignment 2 covers the development and the exam is based on the questions related to the project design and execution.

- Could help to avoid plagiarism since solutions can be unique to the individual students.
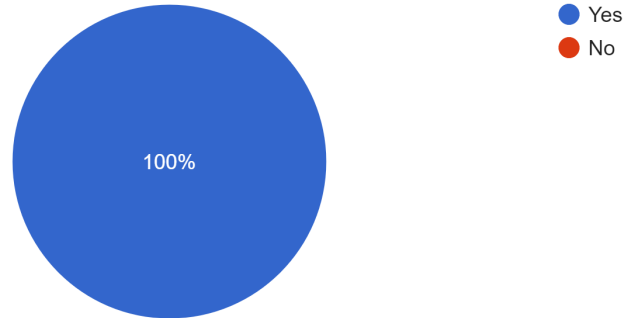
Survey Results

- A survey was conducted among the graduates to identify whether project course helped them in industry.

- 24 graduates responded and all of them overwhelmingly agree that the project course provides real world project experience and skills.

- Survey Questions:

   1. Has the Project structure and content helped you to gain near real project experience?

   2. Have you found new area of interests or talents while studying the project?

   3. Has the Project experience helped you in getting an IT job?

   4. Has the project experience helped you in understanding and executing the project in industry (at work)?
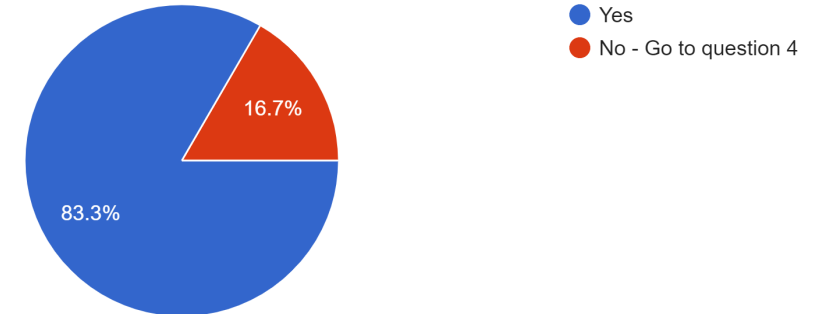
Survey Results Cont.

Structure and Content

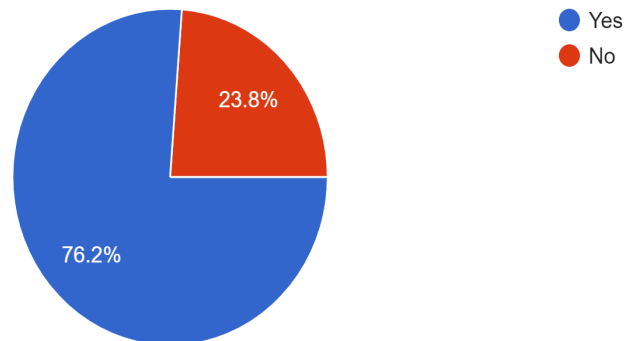1. Has the Project structure and content helped you to gain near real project experience
24 responses

- Yes
- No

100%

Employability

4. Has the Project experience helped you in getting an IT job?
21 responses

- Yes
- No

23.8%

76.2%

New area of interests/talents

2. Have you found new area of interests or talents while studying the project?
24 responses

- Yes
- No - Go to question 4
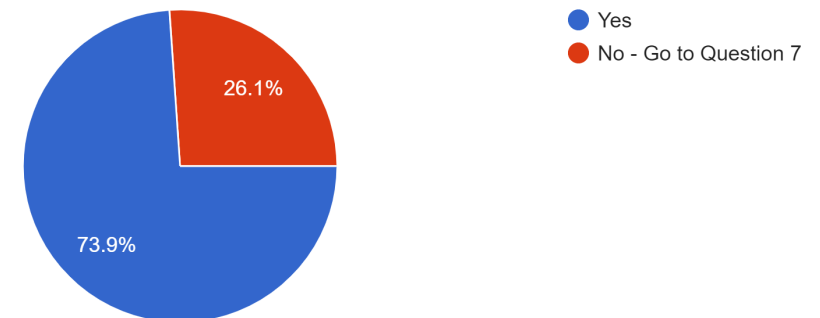
16.7%

83.3%

Integrating into work environment

5. Has the project experience helped you in understanding and executing the project in industry (at work)?
23 responses

- Yes
- No - Go to Question 7

26.1%

73.9%

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Students experience

1. Learnt project management skills with at least one project management tool

2. Mastered the chosen database for the project

3. Software students learnt new languages and frameworks

4. EB students upgraded the skills from intermediate for at least one BI tool

5. Important skill of data cleansing and analysis are in their resume now

6. Role playing helped them to build the confidence

7. Critical thinking and problem-solving skills improved due to Problem-based self-learning which they could use in interviews

8. Teamwork, conflict management and time management improved due to industry like environment

Conclusion

We are following almost all the recommendations made by Kkotsaki et al. (2016)

1) Student support   2) Teacher support   3) Effective group work

4) Balance between didactic instruction with independent inquiry method

5) Reflective assessments   and   6) Student Choice and autonomy

In a report submitted to ACER, Edwards et al. (2015) have emphasized the need for project-based learning even if they are mock projects

The research done by Brewer et al (2022) indicates that Project-based Work Integrated Learning improves students' employability

Reference

Brewer, M., Lewis, S., & Ferns, S. (2022). Interdisciplinary Work-Integrated Learning: Australian University Project-Based Learning Pilots and Practices. *International Journal of Work-Integrated Learning*, *23*(1), 17-30.

Edwards, D., Perkins, K., Pearce, J., & Hong, J. (2015). Work Integrated Learning in STEM in Australian Universities: Final report: Submitted to the Office of the Chief Scientist.

Guo, P., Saab, N., Post, L. S., & Admiraal, W. (2020). A review of project-based learning in higher education: Student outcomes and measures. *International journal of educational research*, *102*, 101586.

Kokotsaki, D., Menzies, V., & Wiggins, A. (2016). Project-based learning: A review of the literature. *Improving schools*, *19*(3), 267-277.

Questions