



This resource is intended to be read in conjunction with the case study on the project led by Derby College	
This is what this resource is	This is a poster representation of the whole project. It is useful to view this alongside Output 7
This is what it is for	To inform effective practice in PBL
This is how it could be used	As a CPD resource for practitioners wishing to trial PBL

Outstanding Teaching, Learning and Assessment (OTLA) Technical Skills National Programme: sharing and developing effective practice

Problem-Based Learning: Research Poster Story,
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12/11/2017



From Factories to Communities of Discovery

A study of how Problem-Based Learning can be used to develop students' behaviours, skills and knowledge to be excellent technical professionals

Aim

To use problem-based learning (PBL) to create a future workforce with higher-level skills, knowledge and behaviours who can drive and respond to rapidly changing industry needs;

To trial a totally different approach to longitudinal development of fledgling engineers, in partnership with employers with a view to using this approach in the forthcoming T-Levels as a way of forming highly skilled professionals for students undertaking study programmes

Hypotheses

1. PBL is an effective pedagogical model to support students to develop into technical professionals progressing to skills employment and higher level learning
2. JPD is an effective model to support the development of employer relationships for T-Level delivery

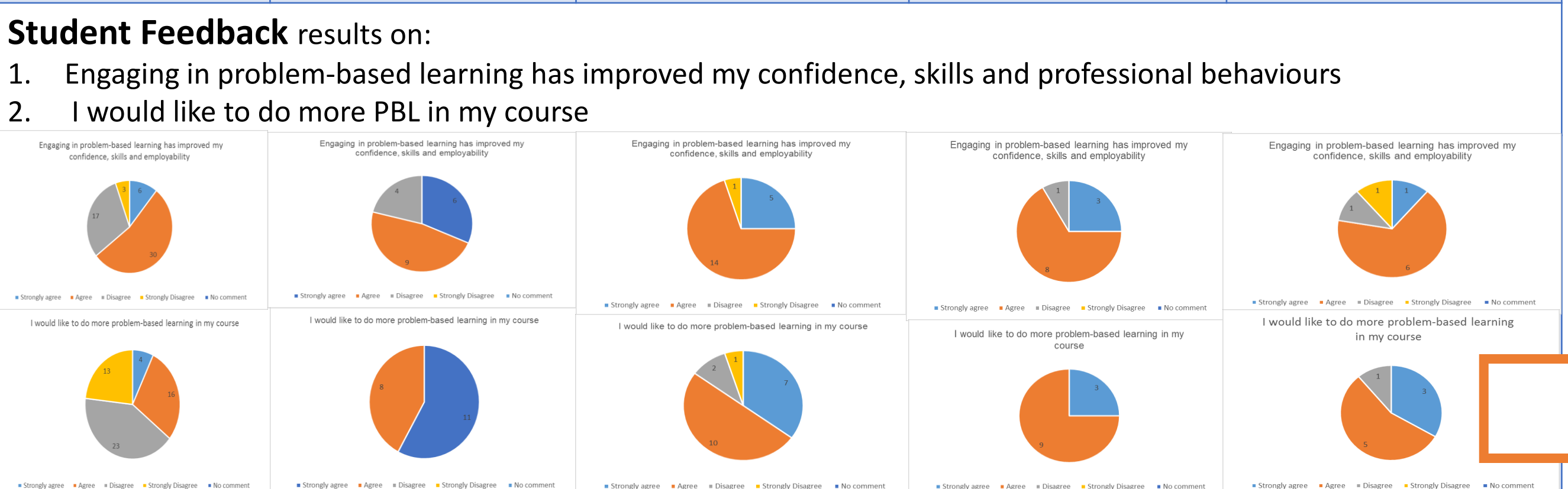
Features of PBL

- Complex, real world situations that have no one “right” answer are the organising focus for learning;
- Problems weave theory to practice;
- Students work in teams to confront the problem, to identify learning gaps and to develop viable solutions;
- It focuses on communication and interpersonal skills, skills that go beyond the area of technical expertise;
- Students gain new information through self-directed learning;
- Teachers act as ‘facilitators’;
- The focus is on the processes rather than the products of knowledge acquisition.

Barrows and Tamblyn (1980); Boud (1985)

What we found

PBL Episode 1	PBL Episode 2	PBL Episode 3	PBL Episode 4	PBL Episode 5
56 new BTEC Y1 L3 Engineering students designed a rollercoaster in their first 2-weeks’ induction	19 L2 BTEC Engineering students created an electronic circuit. In the 5 th week of their course. A L3 student facilitated with a tutor in one lesson	20 L1 and L2 Plumbing students designed a Backflow Rig during induction. This was created as a student competition by Anglian Water over a period of three weeks	12 L3 Y1 BTEC Engineering students tackled a problem on Engine Management Centres during the first few weeks of their course over a period of one week	9 Y2 BTEC Y2 Construction and the Built Environment produced a specification and plan for a construction project



Student Voices

“I enjoyed working in a team, making friends, pushing me”. “I enjoyed the freedom and opportunity to be creative and imaginative”

“I enjoyed being able to make a task independently and learning from my mistakes”

“I enjoyed the challenge of the problem based learning. I also enjoyed working as a team and having the support of each other”

“It challenged me to be more open and to communicate with others”

“Give us more access to industry professionals to make it more realistic and relatable (I made contact by myself)”

Practitioner Voices

For the students who made an effort to overcome their initial worries, confidence increased exponentially as the project progressed, as did their excitement.

“It was nice to facilitate the learning experience and when I was asked a question it was difficult to not give the answer. I had to stop the class to create group discussion for them to work out what they had to do next, the only downside was, the students hated being interrupted”

“It was a struggle to step back and the L1 group struggled with plumbing skills, but they learned how to use the tools, they struggled and made mistakes. We were astounded by the models they built”

“Although we were uncomfortable standing back, we found the experience very rewarding, handing over ownership to students – we will definitely do it again”

“It was rewarding to see students building on their mistakes”

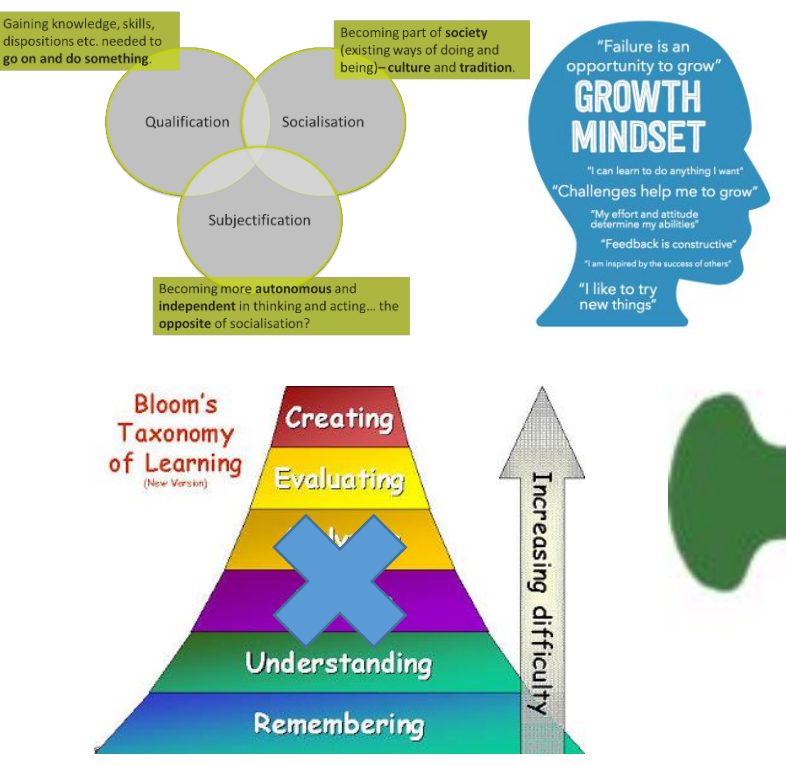
Employer Voices

“I do think the project is both really interesting and important in thinking about the work placement required for T-Levels”

“Being involved from the beginning, and seeing what the students produced has been so positive; they asked me about recruitment too”

Theoretical underpinning of PBL

We used Biesta’s domains of learning to frame the project – going beyond “qualification”. PBL also draws on a range of learning theories, including constructivist learning, the importance of working within a zone of proximal development, experiential learning, mind-set theories and humanist theories. We have discovered that Bloom’s taxonomy of learning objectives is turned on its head in PBL. Learning is not neatly stepped. Students start at the top of Bloom’s and traverse up and down as needs arise. We need to prepare students for this to support their understanding of problem-based learning and their engagement with this process. Perhaps Bloom’s taxonomy loses relevance in real-world technical learning?



What we did

We ran five full days CPD, over six months for practitioners, employers and students; seven PBL episodes created and facilitated in four FE colleges by 9 practitioners and one student, reaching over 130 students. Student feedback gained; foci group feedback collected and practitioner and employer reflections shared.

Conclusions

Most of our PBL episodes were conducted during Induction or the first 6 weeks of a course, which may have skewed the data. However, the results of the trials are positive. Although it will take longer to have definite evidence that PBL is effective in supporting students develop into technical professionals, we believe we have sufficient “green shoots” to keep going, thus moving towards an evidence-based pedagogy. There are tensions to resolve:

1. Articulating the employer role and relationships required for successful PBL in order to have an effective JPD model with employers for T-Level delivery. Higher-level apprentices could be effectively used to bring the “real world” element
2. PBL focuses on holistic learning to be a “professional” so we need to be clear on what is to be “weighed and measured” in the delivery of T-Levels and the focus of “qualification” and the surrounding audit culture
3. Educational leaders need to have a depth of understanding of this pedagogical approach; changing cultures within the sector
4. Learning environments need to be conducive to PBL – these may not be single classrooms with single teachers

Characteristics needed for successful PBL

