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REAL-WORLD PBL IN AN ENGLISH BOOTCAMP: ENHANCING ENGINEERING STUDENTS' LEARNER AUTONOMY

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Abstract:

Short-term intensive English language programmes are frequently used to strengthen learners' communication confidence; however, limited empirical attention has examined whether short-duration immersion programmes can foster learner autonomy among engineering undergraduates in Malaysian higher education, particularly when organised through problem-based learning (PBL). Anchored in learner autonomy theory, self-directed learning, and constructivist principles of PBL, this study examined autonomy-related learning behaviours among Malaysian engineering students who participated in a three-day English Language Bootcamp Immersive Program. A mixed-method post-program design was employed with 37 participants. Quantitative data were collected through five-point Likert-scale items measuring control, decision-making, ownership, choice, goal setting, independent learning, creativity, and problem-solving, while qualitative data were gathered through open-ended responses. Descriptive statistics, Cronbach's alpha, and thematic coding were used to analyse the data. The findings indicated relatively high levels of learner autonomy, with a composite mean score of 3.88 (SD = 0.69), supported by strong internal consistency for the learner autonomy scale (alpha = .92). Independent learning and goal setting emerged as the most strongly endorsed autonomy dimensions. Qualitative findings further highlighted engagement, language development, collaboration, and students' desire for more speaking practice. The study demonstrates that short-term PBL-based immersive programmes can serve as effective pedagogical interventions for fostering learner autonomy, collaborative engagement, and self-directed learning in ESL contexts. The findings offer practical

implications for designing intensive language immersion programmes in higher education.

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Keyword:

Bootcamp, Engineering Students, ESL, Problem-Based Learning, Learner Autonomy



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Introduction

Problem-based learning (PBL) requires students to work in groups to solve authentic complex problems which they encounter during their learning process. Through guided inquiry students must determine their learning requirements and discover relevant materials before they can develop their solutions (Hmelo-Silver 2004; Savery 2006). The approach creates authentic communication situations for language education because students need to exchange their thoughts while they work on their projects and practice their delivery and show their results. The learning process transforms from students receiving knowledge passively to students actively using language and working together with others.

The learning processes establish a direct connection to learner autonomy which experts define as the capacity of learners to manage their own educational objectives and their methods of learning and assessment (Benson, 2013; Holec, 1981; Little, 1991). The concept of autonomy allows learners to study freely without assistance. The concept requires students to take charge of their educational experience while working in environments that provide them with opportunities to make choices and think critically and manage their own learning. The ability to use English for academic and professional purposes requires ESL learners to develop this skill because they need to operate in these situations without depending on their teachers.

The research gap is particularly evident in short-duration immersive English programmes for engineering students in Malaysian higher education. Although PBL has been widely discussed in semester-long or extended learning contexts, fewer studies have examined whether a three-day language bootcamp can meaningfully stimulate autonomy-related behaviours such as goal setting, ownership, choice, independent learning, and collaborative decision-making. This limitation matters because engineering students are expected to communicate across disciplines, solve real-world problems, and manage professional learning beyond teacher-led

instruction. Therefore, the present study addresses a specific gap at the intersection of short-term immersion, PBL pedagogy, engineering education, and ESL learner autonomy in Malaysia.

In Malaysia, learner autonomy has been positioned as an important educational goal. Saad et al. (2024) demonstrate that the Malaysian Education Blueprint (MEB 2013–2025) encourages students to engage in Autonomous Language Learning for the purpose of enhancing their language skills. Students in English classrooms experience restricted learning because the educational system emphasizes examination preparation and teacher-led instruction instead of letting them establish their learning objectives and develop their educational pathways. Project- and problem-based approaches have been proposed as effective methods which enable students to take responsibility for their learning through the implementation of decision-making and goal-setting elements within their assigned tasks. The implementation of these methods to establish learner independence in Malaysian ESL environments remains a research gap according to Saad et al. (2024) because traditional teaching methods still exist as the primary educational approach.

Malaysian research studies demonstrate that PBL has potential to assist ESL students in achieving learning independence. Project-based tasks enable students to develop confidence and responsibility through real-world tasks according to research which shows that learners gain better problem-solving skills and communication abilities and personal development (Abu Bakar et al. 2019 and Chong and Reinders 2022 and Guo et al. 2024 and Rosli et al. 2025 and Thang 2009). The research findings show that schools require instructional designs which help students make their own choices because most classrooms do not yet achieve proper student independence.

Addressing this gap, the current study investigates autonomy outcomes among Malaysian engineering students who attended a three-day English Language Bootcamp Immersive Program. The bootcamp was structured around real-world PBL tasks that required learners to collaborate, make choices, seek information, and present solutions in English. The study examines students' autonomy perceptions across multiple dimensions and uses open-ended feedback to interpret and validate the quantitative survey findings.

Research Questions

- RQ1: What is the level of learner autonomy reported by Malaysian engineering students after participating in a three-day PBL English language bootcamp?
- RQ2: Which autonomy dimensions (control/decision-making, ownership, choice, goal setting, independent learning) are most strongly endorsed?
- RQ3: How do students' open-ended comments triangulate and explain the autonomy-related survey outcomes?

Literature Review

Problem-Based Learning in Language Education

Problem-based learning (PBL) is a student-centred instructional approach that requires learners to work collaboratively to solve authentic, complex, and meaningful problems. Instead of

receiving knowledge passively from the teacher, students are required to identify what they need to know, search for relevant information, discuss possible solutions, and present their findings through purposeful communication. Hmelo-Silver (2004) explains that PBL encourages students to develop flexible knowledge, problem-solving skills, self-directed learning strategies, collaboration, and intrinsic motivation. Similarly, Savery (2006) emphasizes that PBL is grounded in learner responsibility, inquiry, and reflection, making it suitable for educational contexts that aim to develop independent and active learners.

In language education, PBL provides meaningful opportunities for students to use language in realistic situations. English is not practised only through isolated grammar exercises or controlled classroom drills, but through discussion, negotiation, explanation, problem-solving, and presentation. This is particularly relevant in ESL contexts, where learners need to use English for academic, professional, and social communication. Through PBL, students are exposed to tasks that require them to express opinions, ask questions, justify decisions, and collaborate with peers. These communicative demands help create a learning environment in which students use English as a tool for completing meaningful tasks rather than as a subject to be studied passively.

Learner Autonomy in ESL Learning

Learner autonomy is a key concept in language education. Holec (1981) defines learner autonomy as the ability to take charge of one's own learning, while Little (1991) highlights learners' capacity for detachment, critical reflection, decision-making, and independent action. Benson (2013) further explains that autonomy does not simply mean learning alone. Instead, it refers to learners' ability to exercise control over different aspects of learning, including setting goals, choosing strategies, monitoring progress, and evaluating outcomes. In this sense, autonomy involves both individual responsibility and participation in supportive learning environments.

For ESL learners, autonomy is especially important because language development continues beyond classroom instruction. Students who depend fully on teacher direction may struggle to improve their English outside formal learning settings. Autonomous learners, however, are more likely to identify their weaknesses, search for resources, practise independently, and evaluate their own progress. This is important for university students, including engineering undergraduates, who are expected to use English for academic tasks, technical communication, group projects, presentations, and future workplace interactions. Learner autonomy therefore supports not only language development, but also broader academic and professional readiness. Learner autonomy is also closely related to self-regulated learning. Zimmerman (2002) argues that self-regulated learners are able to plan, monitor, and evaluate their own learning behaviours. These processes are reflected in autonomy-related behaviours such as setting goals, making choices, seeking information, managing tasks, and evaluating progress. In language learning, such behaviours are important because students need to continue improving their English beyond teacher-led classroom instruction.

The present study is therefore theoretically positioned at the intersection of learner autonomy, self-regulated learning, and PBL-based constructivist learning. From this perspective, autonomy develops when learners are given structured opportunities to make decisions, set goals, negotiate responsibilities, search for information, and reflect on task outcomes. In the

context of an English bootcamp, PBL tasks can create experiential learning opportunities because students use language to solve problems, produce outputs, and collaborate with peers. This theoretical positioning supports the study's focus on whether a short intensive programme can create conditions for self-directed learning and autonomy in ESL higher education (Benson, 2013; Hmelo-Silver, 2004; Savery, 2006; Zimmerman, 2002).

Methodology

Research Design

This study adopted a mixed-method post-program evaluation design to examine students' perceived learner autonomy following a three-day English language bootcamp. Quantitative data were collected through structured Likert-scale items, while qualitative data were collected through an open-ended response item. This design was appropriate because the numerical data identified the level and pattern of autonomy-related behaviours, whereas the qualitative comments provided contextual explanations of how students experienced the PBL activities. The integration of both data sources allowed the study to describe outcomes and interpret the meanings behind those outcomes (Creswell & Plano Clark, 2018).

Context: Bootcamp Activities

The English Language Bootcamp Immersive Program was conducted over three consecutive days with Malaysian engineering students. Students worked in groups of six to complete authentic PBL tasks involving local problem-solving, cultural storytelling, and digital promotion. These tasks required group discussion, information search, planning, product creation, and oral presentation. The context was therefore suitable for examining whether a short, intensive, task-based English programme could support autonomy-related behaviours in an ESL higher education setting.

Participants

A total of 37 engineering students took part in the bootcamp and completed the post-program survey (N = 37). The study assessed maximum English proficiency of participants through their self-reported CEFR levels which ranged from A1 to C1 but most of them identified themselves at the B1 to B2 proficiency level (see Table 1).

Instrument

The questionnaire used a five-point Likert scale which ranged from strongly disagree (1) to strongly agree (5) to measure students' learning experience perception during the bootcamp. The learner autonomy items assessed student development through their ability to make choices and take responsibility for learning activities and establish their learning objectives while studying independently which reflects typical research areas about learner autonomy (Benson 2013 Little 1991). A set of items measured creativity and problem approach skills by requiring students to explain their process of developing ideas and evaluating different solutions and approaching the PBL tasks they completed with innovative thinking. The bootcamp's entire effects were evaluated through two global items which also assessed how likely students were to recommend the program to others. The study included an open-ended

question that allowed participants to share their complete experiences through additional comments and suggestions beyond the available fixed-response options.

Data Analysis

Quantitative data were analysed using descriptive statistics, including means, standard deviations, standard errors, and agreement percentages. Internal consistency was examined using Cronbach's alpha for the learner autonomy and creativity/problem-approach scales. Qualitative responses were analysed through thematic coding guided by Braun and Clarke's (2006) six phases: familiarisation, initial coding, theme development, theme review, theme definition, and reporting. The qualitative findings were then compared with the survey results to triangulate and explain students' reported autonomy-related behaviours.

Results And Discussion

Table 1. Participant Profile (N = 37)

Variable	Category	n	%
CEFR level	B1	25	67.6
CEFR level	B2	9	24.3
CEFR level	OTHER	1	2.7
CEFR level	A1	1	2.7
CEFR level	C1	1	2.7
Family income	RM2000 and below	11	29.7
Family income	RM2001 - RM4000	9	24.3
Family income	RM8000 and above	6	16.2
Family income	RM4001 - RM6000	5	13.5
Family income	RM6001 - RM8000	4	10.8
Family income	No Salary	2	5.4

Table 2. Internal Consistency of Scales

Scale	k	Cronbach's α
Learner autonomy	6	0.92
Creativity/problem-approach	5	0.91

Table 3. Learner Autonomy Outcomes After the Bootcamp

Item	N	Mean	Standard Deviation	Standard Error
Control my own learning and decision-making	37	3.73	0.73	0.12
Take ownership of 37 projects and tasks		3.76	0.89	0.15

Make choices in how I approach problems	37	3.84	0.83	0.14
Set my own goals and work toward them (1)	37	3.97	0.76	0.13
Set my own goals and work toward them (2)	37	3.97	0.87	0.14
Learn independently and seek out information	37	4.03	0.83	0.14

The findings indicated relatively high levels of learner autonomy after the bootcamp (composite $M = 3.88$, $SD = 0.69$). Among the six autonomy indicators, independent learning and information seeking recorded the highest mean score ($M = 4.03$, $SD = 0.83$), followed by both goal-setting items ($M = 3.97$). These results suggest that students were most confident in setting learning goals, pursuing them during the PBL tasks, and seeking information independently. The comparatively lower, though still positive, scores for control and decision-making ($M = 3.73$) and ownership ($M = 3.76$) indicate that shared group decision-making may have shaped how students perceived individual autonomy.

Table 4. Creativity/Problem-Approach Outcomes

Item	N	Mean	Standard Deviation	Standard Error
Think creatively and propose innovative solutions	37	4.00	0.94	0.15
Express ideas in a unique way	37	3.70	0.85	0.14
Explore creativity and imagination	37	4.00	0.82	0.13
Develop new ways to approach problems	37	3.92	0.89	0.15
Think ‘outside the box’	37	4.00	0.82	0.13

Students also reported positive creativity/problem-approach perceptions (composite $M = 3.92$, $SD = 0.74$). The highest scores were recorded for thinking creatively, exploring creativity and imagination, and thinking outside the box (all $M = 4.00$), suggesting that the bootcamp's authentic tasks encouraged idea generation, problem exploration, and creative response development.

Table 5. Open-Ended Feedback Themes (Substantive Responses n = 23)

Theme	n	%	Example excerpt (abridged)
Engagement/enjoyment	6	26.1	“Amazing programme !”
Implementation suggestions	5	21.7	“Make more speaking practice”
Language development	4	17.4	“Make more speaking practice”
Collaboration/communication	2	8.7	“I hope groups are more balanced.”
Confidence/empowerment	1	4.3	“i feel more confident completing tasks in English”

The survey results received general support from open-ended responses, which provided detailed insights into how students experienced the bootcamp. Students found the activities both engaging and enjoyable, which demonstrates that the PBL tasks created motivation through their use of culturally relevant themes. Several students also pointed out that they wanted more opportunities to practise speaking. The comments showed that students had begun to identify their learning requirements and areas of development, rather than showing discontent. The feedback about collaboration showed how the tasks required people to work together while only a few responses mentioned difficulties that groups faced during their work. Fewer students mentioned confidence yet those who made this statement about their English usage during tasks showed their increased comfort with the language which confirmed the autonomy and confidence gains that the quantitative research showed.

Discussion

The autonomy outcomes observed in this study appear to reflect the constructivist and experiential nature of the PBL bootcamp. Rather than completing predetermined language exercises, students had to interpret task demands, negotiate roles, search for information, make decisions, and justify their outputs. These processes positioned students as active problem-solvers and language users, which aligns with learner autonomy as control over learning processes and with PBL as inquiry-based participation (Benson, 2013; Hmelo-Silver, 2004; Holec, 1981; Savery, 2006).

The strongest autonomy dimensions were goal setting and independent learning. This pattern indicates that even a brief intensive programme can support autonomy when tasks require students to plan, monitor progress, and locate resources to complete real-world outputs. These behaviours reflect self-regulated learning because students were not only completing tasks, but also managing the steps needed to achieve them (Zimmerman, 2002). However, the post-program design means that these findings should be interpreted as perceived autonomy development rather than confirmed behavioural change over time.

The qualitative findings help to clarify these patterns in more concrete terms. The students found the bootcamp to be attractive and enjoyable because they considered the PBL activities to have genuine importance for their learning. The positive responses resulted from using culturally familiar tasks which included folktale-based drama and locally relevant problem scenarios in the intensive learning format that required continuous student engagement.

The commentaries about language development showed researchers needed more speaking activities. The students showed increasing knowledge about their academic needs because they could explain their development requirements. Students who engage in this type of reflection show emerging learner autonomy through their ability to monitor their progress and develop their educational goals.

The social dimension of PBL was also evident in the collaboration-related feedback. Group work enabled students to exchange ideas and practise English, but some comments pointed to challenges such as uneven participation and group balance. The slightly lower scores for control and ownership may reflect the tension between individual autonomy and shared decision-making in collaborative tasks. Previous studies have similarly noted that group-based PBL can involve coordination difficulties, especially in time-constrained settings (Chong & Reinders, 2022; Hmelo-Silver, 2004; Savery, 2006). Future bootcamps should therefore include role rotation, clear task milestones, and short reflective checkpoints to help students retain personal responsibility within collaborative learning.

Taken together, the quantitative and qualitative findings suggest that autonomy-supportive PBL elements, namely choice, planning, reflection, collaboration, and authentic problem-solving, can operate effectively even within a short instructional period. The results also point to a practical design implication: short immersion programmes should not only expose students to English-rich tasks but also build in structured opportunities for learners to make decisions, monitor progress, and reflect on their learning needs.

Conclusion And Recommendation

This study examined learner autonomy among Malaysian engineering undergraduates after a three-day PBL-based English Language Bootcamp. The findings indicated relatively high autonomy outcomes, particularly in goal setting and independent learning, while qualitative comments showed engagement, language development, collaboration, and a desire for more speaking practice.

The study demonstrates that short-term PBL-based immersive programmes can serve as effective pedagogical interventions for fostering learner autonomy, collaborative engagement, and self-directed learning in ESL contexts. Its practical significance lies in showing that intensive English programmes in higher education can move beyond confidence-building activities by embedding real-world tasks, learner choice, group decision-making, and reflective opportunities. Such design features can help institutions develop short but meaningful language immersion programmes for students in professional and technical disciplines. Nevertheless, the study has limitations. The post-program design, absence of a control group, small sample, and reliance on self-reported data limit the extent to which causal claims can be made. Future studies should use pre-post or quasi-experimental designs with larger and more diverse

participant groups, as well as observational, performance-based, or longitudinal measures of autonomy-related behaviour.

The authors used generative AI tools only for language improvement and clarity during drafting. The authors retained full control over the research design, data collection, data analysis, interpretation, and final manuscript content.

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Ethics Statement: Option A
This study was conducted in accordance with ethical research standards. Informed consent was obtained from all participants prior to data collection. Participation was voluntary, and respondents were assured of confidentiality and anonymity. The data collected were used solely for academic purposes.

Author Contribution Statement: All authors contributed significantly to the development of this manuscript. [Sharina Saad] was responsible for the conceptualization, methodology, and overall supervision of the study. [Sharina Saad] handled data collection, analysis, and interpretation of results. [Alia Nabella Fateha Zolkifli] contributed to the literature review, drafting, and critical revision of the manuscript. All authors read and approved the final version of the manuscript prior to submission.

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