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A Place-Based Education (PBE) Approach to Teaching Environmental Fieldwork in Higher Learning Education using Urban Tree Hazard Assessment as A Case Study

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ABSTRACT

Higher education progressively reviews for teaching approaches that move beyond traditional lectures and textbooks, especially in fields like environmental science, where real-world application is essential. However, many students still find it difficult to connect theoretical understanding to real-world problems in their local environment. This gap can limit student engagement, critical thinking, and long-term understanding of complex environmental issues. Place-Based Education (PBE) encourage students to engage with their immediate environment as a meaningful learning site, fostering deeper understanding, social responsibility, and contextualized knowledge. This research explores the pedagogical impact of a place-based fieldwork project in which a university student assessed the urban tree hazard within the campus of UiTM Shah Alam, Selangor, Malaysia, as a case study. By analysing the student's map, photographic documentation, and hazard scoring, this research investigates how local and real-world tasks support learning outcomes in higher education. The findings show that the student demonstrated improved observation skills, critical thinking, and the ability to apply theoretical concepts to practical contexts. It is also encouraged environmental responsibility and spatial awareness, two important objectives in environmental education. Despite being centred on a single participant, the case study offers an insightful finding for educators to integrate experiential, site-based learning into their teaching practice. This study indicates that PBE is a promising instrument for connecting lecture room instruction with real-world applications, and it suggests that it may be widely used in higher education programs that focus on the environment and sustainability.

1. Introduction

Previous researches examine multiple Place-Based Education (PBE) programmes and its contribution to sustainability education across cognitive, socio-emotional, behavioural dimensions [1], case study for urban outdoor environment setting using real client and measuring attitudes shifts

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[2]. In the context of Malaysia, although there are studies in higher education focus on project-based learning (PBL) or real-client projects, but fewer that explicitly use the *place-based education* (PBE) framework or thinking [3], investigates how students use outdoor spaces on campus for learning outside formal lectures by examining and documenting the physical or infrastructure barrier but less documented are the pedagogical process and emotional or behavioural changes as a result of the project [4]. Previous research looks at how outdoor learning environments are designed and under-utilised in Malaysian higher education, discusses the discomfort, lack of facilities, etc. for outdoor learning in tertiary settings [5]. Some researches explore the relationship between physical place/space and learning in problem-based learning settings in Malaysian universities; how current learning environments (architecture, physical infrastructure) support or hinder PBL [6].

Other research integrating more real-world or place-based components is important and it shows that sense of place can matter for university experience compared to the hybrid or partly remote learning [7].

There seem to be no studies that are deep case studies of individual student in higher education settings doing a real-project that ties theory, local place, environmental or tree hazard assessment that closely track student learning outcomes (knowledge, skills, environmental awareness) as a result of doing a specific environmental hazard assessment project or similar. Student's deeper engagement reveals nuances, for example the theory-practice connection, emotional attachment to a local place, and transforming environmental awareness do not happen at that personal level. Less attention in some studies to tree hazard assessment but more on environmental literacy, sustainability, watershed health, and conservation [8].

This single-case design is supported by qualitative research traditions that prioritize depth, richness, and context over sample size [8]. Furthermore, recent studies [9], [10] argue that detailed local learning experience, even at small scales can reveal important insights into pedagogy and learner development. The work on localized teacher learning environments also reinforces the value of deeply contextual educational inquiry [11].

Therefore, this research explores the pedagogical impact of a place-based fieldwork project in which a university student assessed the urban tree hazard within the campus of UiTM Shah Alam, Selangor, Malaysia, as a case study. The objectives are:

2. Methodology

This study employs a qualitative single-case study approach to explore how a localized environmental project, a campus-based tree hazard assessment can support student learning through place-based pedagogy. Rather than seeking generalization, the study is designed to generate insightful, teaching-relevant findings from in-depth analysis of one student's work.

2.1 Materials and Methods

The participant was an undergraduate student at Universiti Teknologi MARA (UiTM), Shah Alam who conducted a field-based hazard assessment of urban trees within the campus environment. Based on the validated sources, the participant created a hazard map, took detailed photographs, scored each tree based on risk indicators, and interpreted their findings.

2.2 Data Sources

The data sources are: 1) student-created hazard assessment map; 2) photographic documentation of trees and risk indicators; 3) hazard scoring records; and 4) fieldwork reflections. Table 1 shows the template used for analysing the participant's outputs.

Table 1
Analysis template for participant's output

Output Type	**Observations**	**Learning Observation**	**Teaching Insight**
Map	Map mark's locations of trees with hazard zones; labels visible; includes human activity areas (e.g., walkways, buildings nearby).	Student shows spatial awareness and risk mapping skills.	Field mapping encourages students to think about environmental data in relation to real-world use and safety.
Photos	Photos include root exposure, trunk lean, and canopy loss. Some annotations identify likely hazards and severity.	Student demonstrates detailed observation and ability to classify hazards.	Photo documentation helps students slow down, notice details, and apply assessment criteria in context.
Hazard Scores	Risk levels assigned based on tree condition; mostly aligns with observed evidence. A few inconsistencies noted	Student applies theoretical knowledge with growing confidence; shows developing judgment.	Scoring activities give students a structured way to practice applying classroom concepts to messy real-life data.

Figure 1(a) and 1(b) shows the example of the observations and photographic evidence collected during the study.

Fig. 1. (a). Example of tree with medium defect

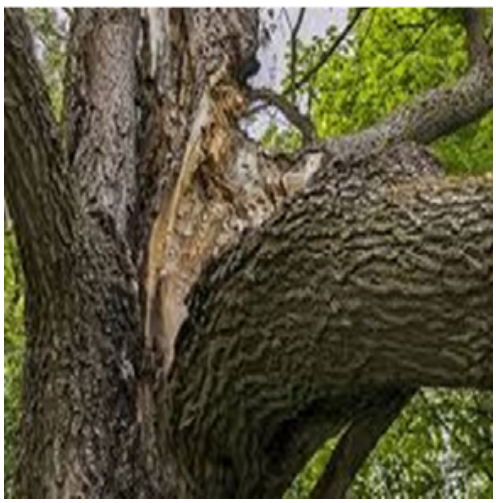

Fig. 1.(b). Example of tree with severe defect

Figure 2 shows the map for tree hazard rating and the locations based on the observation made at the study area.

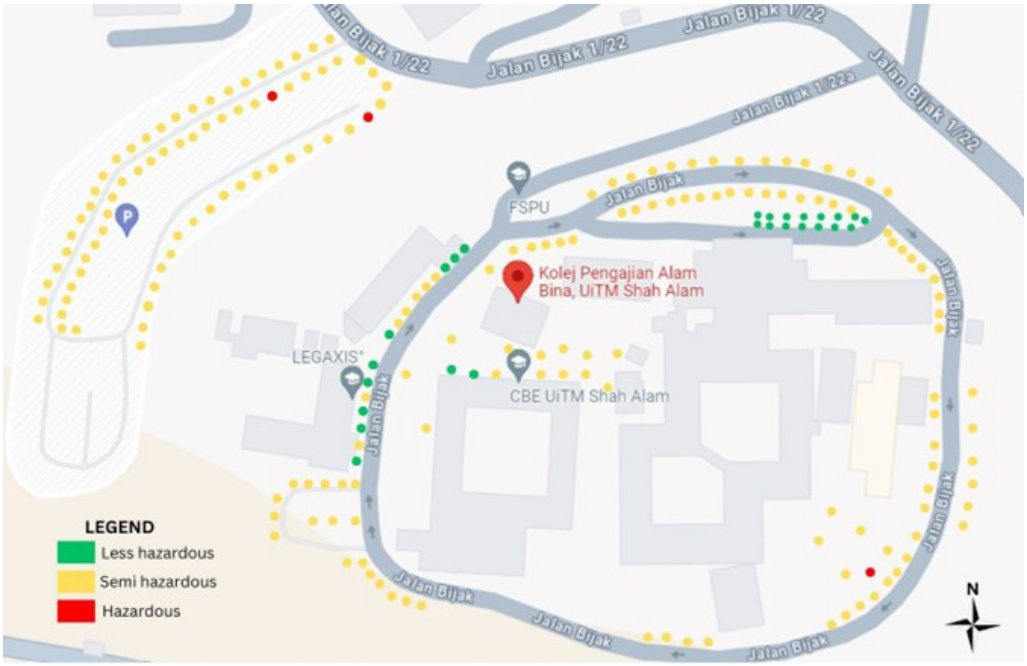

Fig. 2. Map shows the location of tree hazard assessment rating

Refers to Table 2, the hazard rating score was divided into three categories based on the average danger level.

Table 2
Hazard rating score

Hazard rating score	Category
1-14	Less hazardous
5-8	Semi hazardous
9-12	Hazardous

3. Results

Using the thematic approach, the analysis focused on interpreting how a single participant's engagement with a place-based hazard assessment project demonstrated learning outcomes aligned with experiential and place-based education. Three primary themes emerged from the data: 1) applied spatial understanding of environmental risk, 2) development of observation and assessment skills, and 3) evidence of local environmental awareness.

3.1 Applied Spatial Understanding of Environmental Risk

The participant's hazard map illustrated a clear grasp of spatial relationships between trees and human infrastructure (e.g., walkways, buildings). By mapping tree locations accurately and assigning relative risk zones, the student demonstrated an ability to translate field observations into spatially organized data. The map also revealed the student's growing awareness of how physical proximity and context influence hazard ratings.

However, small inconsistencies in symbol placement and legend use suggested areas where further framework in map-making conventions could improve clarity. This points to pedagogical need for more guided instruction on spatial communication tools.

3.2 Observation and Risk Assessment Skills

The participant documented 15 trees with photographs and hazard scores based on visual indicators such as crack trunks, exposed roots, and canopy dieback. The photo evidence often aligned well with the assigned scores, suggesting an ability to connect visual cues with hazard criteria. For example, one photograph of a tree with severe trunk track was appropriately scored as "High Risk."

Thus, some inconsistencies were observed such as trees with similar symptoms were assigned different scores, indicating a potential misunderstanding of thresholds. This strengthens the value of guided field practice to improve the reliability in the future iterations of the activity.

3.3 Environmental Awareness and Place Connection

The student's selection of trees which include, for example the academic blocks, walkways and car parks suggests an active engagement with the campus environment. The inclusion of trees from different situation of areas reveals a deliberate effort to explore the side broadly.

This behavior supports one of the main aims of place-based education: to foster a stronger sense of place and local stewardship [9,12]. The student's project implicitly revealed a shift from passive observation to active environmental scanning, a pedagogically valuable outcome especially in environmental science education. Table 4 summarize the finding of the study.

Table 4
Summary of the study findings

Theme	Evidence	Pedagogical Insight
Spatial understanding	Hazard map accuracy, spatial layout	Teach mapping conventions more explicitly
Observation + scoring skills	Photo-score alignment, occasional errors	Use calibration exercises and field scoring rubrics
Place engagement	Broad site coverage, tree selection	Encourage reflection on local responsibility

4. Discussion

This study reinforces the value of PBE, the experiential learning frameworks in higher education by examining how one student engaged with a real-world environmental task on campus. The project's outputs which include maps, photographs, and hazard scores revealed more than technical understanding. They showed signs of active spatial reasoning, applied observation, and meaningful interaction with the local learning environment.

Consistent with the previous research [12] experiential learning cycle, the student progressed through observation, analysis, and application. The hazard scoring exercise demanded real-time judgment, while mapping required spatial organization are both of which support higher-order thinking. However, the presence of scoring inconsistencies and map symbol confusion also suggests that experiential tasks must be accompanied by structured framework and timely feedback to maximize learning.

From a PBE standpoints, this case aligns well with [9] findings that localized, context-rich projects enhance learner engagement and foster stronger connections to place. The student's broad exploration of campus zones suggests that even a single field task can encourage environmental noticing in which a critical outcome in sustainability and environmental education [4,14].

These findings point to two key pedagogical implications. First, integrating small-scale, site-specific fieldwork can help students move from passive recipients of knowledge to active knowledge constructors. Second, even a single-student case can reveal deep learning processes when educators pay close attention to outputs and student choices. This supports recent calls for more personalized and locally anchored teaching strategies in higher education [15].

5. Conclusions

Despite the limited sample, this case study design aligns with qualitative research standards emphasizing contextual depth over breadth [16]. It is supported by previous researches emphasizing the importance of local context and educator/student situated experiences in place-based and experiential learning [9,17,18]. Such frameworks validate the usefulness of detailed single-case analysis for extracting pedagogical principles.

This study explored how one student engaged with a place-based tree hazard assessment task in an urban university campus and what their work revealed about teaching and learning. Through analysis of maps, photos, and hazard scores, we found that real-world, PBE experiential learning supported the development of spatial reasoning, environmental awareness, and applied assessment skills.

While based on a single case, the findings provide valuable insight into how higher education instructors can design experiential, site-specific learning opportunities that connect theory to practice. The study also reinforces the relevance of PBE in fostering student engagement, sense of place, and practical application of knowledge.

Future work could expand this approach by involving larger student groups, embedding reflection components, and using student data to co-design fieldwork rubrics and learning goals. Even at small scales, localized field projects can deepen disciplinary learning and offer meaningful, transformative experiences in higher education.

6. Recommendation

Based on the analysis of this single-student case study, several recommendations can be made to enhance the design and implementation of PBE which includes fieldwork analysis and experiential learning in higher education particularly within environmental science and related disciplines.

6.1Embed Structured Fieldwork in Course Design

Field-based projects like tree hazard assessments should be intentionally designed as part of course outcomes, not treated as optional or supplementary activities. Embedding these tasks in syllabi ensures alignment with learning objectives and assessment criteria.

6.2 Support Fieldwork with Clear Rubrics

While experiential learning encourages independent thinking, students benefit from clear guidance. Rubrics for observation, mapping, and scoring along with sample models can help students develop reliable field skills.

6.3 Incorporate Student Reflection to Deepen Learning

To strengthen the connection between place, learning, and self-awareness, reflective components (journals, photo essays, or short videos) should be added. These help students articulate their learning processes and foster deeper engagement with the site and subject matter.

6.4 Encourage Local and Campus-Based Learning Projects

Universities should promote campus and community environments as living laboratories. Even small-scale, hyper-local projects like the one in this study can offer rich, pedagogical value when students are encouraged to observe and interact meaningfully with their surroundings.

6.5 Use Individual Case Studies to Inform Teaching Practice

Even a single student's work can reveal important patterns in learning, motivation, and misunderstanding. Instructors should regularly review student field outputs not just for grading, but for curriculum improvement and responsive teaching.

To fully implement this approach, academic staff may need professional development in designing and assessing experiential, place-responsive tasks. Institutions could support communities of practice around PBE, particularly in disciplines like geography, environmental science, and education.

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