v3: 18 January 2023

Research Article

Participatory Budgeting for Public Involvement in Environmental Sustainability at a Thai University

Peer-approved: 9 December 2022

Qeios, Vol. 4 (2022)
ISSN: 2632-3834

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Participatory democracy where the public influences and feels involved in policy making is an ideal in democratic societies. In this paper, principles of participatory democracy are implemented at a Thai university through participatory budgeting focusing on environmental sustainability projects. On a general education course, students generated and proposed projects for environmental sustainability at the university. All university members were invited to vote on which projects should be actually implemented within the constraints of a limited budget. The study focuses on the public's bases for selecting projects to implement and their reactions to being invited to take part in participatory budgeting. A corpus-informed analysis of the public's responses shows that participants engaged in thoughtful community-oriented consideration of the projects and were overwhelmingly positive about their involvement. These findings suggest that participatory budgeting is a valuable tool for raising awareness of and promoting involvement in environmental sustainability.

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Introduction

Participatory democracy where citizens are directly involved in policy decision making is an ideal for democratic societies, and, if education is to reflect and promote society's values, public participation in policy setting should also be implemented in education. This paper presents a case study of participatory democracy in the form of participatory budgeting at a Thai university. Members of the university were invited to vote on student-generated environmental projects to be implemented at the university. The paper focuses on the reactions of the university members to taking part in participatory budgeting.

Participatory budgeting

Participatory democracy has two broad goals - for the public's views to have an influence on policy and for the public to feel involved in policy making – and can take many forms. Bishop and Davis (2002), for example, identify five types which fall under two broad categories. Most public participation initiatives view participation as consultation (including partnership, standing and consumer choice) where the public's views are taken into account in the decision. Seven of the eight main public participation methods listed by Rowe and Frewer (2000) are participation as consultation. However, in participation as consultation the actual decision is taken by the authorities and the extent to which public input influences the decision is often unclear (Michels & De Graaf, 2010; Winz & Brierley, 2007). Furthermore, the public whose input may be taken into account is generally a small section

 doi.org/10.32388/BKTXZ9.3

of the overall population meaning that there may be issues of representativeness and that the vast majority of the public feel no involvement.

The alternative to participation as consultation is participation as control where the actual decision is made by the public through popular choice. The only method of Rowe and Frewer (2000) which manifests participation as control is referenda. A referendum aims to give every member of the population a chance to vote, usually as a yes/no decision, with the more popular choice being implemented. With the exception of a few countries such as Switzerland, referenda occur at most once every few years and are reserved for very high-stakes decisions (Anttiroiko, 2003), such as Brexit in the UK, largely due to the enormous expense of organizing a referendum. So even though referenda achieve the two key goals of public participation – influence and involvement – in most contexts, organizing a referendum is often impractical.

Since 2000, there have been suggestions to overcome the practicality problems of traditional referenda by using e-voting. This would require networked technology to be available to every eligible citizen (Petrik, 2009) but still runs the risk of possible fraud and voter coercion (Gibson *et al.*, 2016). E-voting then may be more appropriate for lower-stakes selection of policy strategies (Petrik, 2009) where issues of fraud and coercion are less crucial. In such cases, the broad policy goal has been set but there is a range of competing projects or strategies for implementing the policy goal and e-voting could be used to choose among these. Since all projects included in the e-voting have been rated as appropriate by the authorities, even if fraud occurs it is not likely to have major detrimental effects. While referenda apply at a national level, e-voting to select policy strategies has become relatively common at municipal levels in the form of participatory budgeting (PB).

PB is "a budgeting practice built on the active participation of citizens in budgetary decisions with the aim of influencing resource allocation" (Bartocci *et al.*, 2022, p. 2). Starting in Brazil in the 1980s, PB has spread to become a tool available to many local councils for budget allocation. By involving the public in proposing projects and voting on which projects should receive funding, PB has four main goals (Peixoto, 2008). First, since projects or strategies can be proposed by any eligible member of the public, there is a chance that innovative projects that would not otherwise be conceived can be implemented since the pool of people able to propose projects is large. Second, through voting the public can become more aware of the work of the council. Third, the strategies implemented are more likely to be relevant and salient to a large proportion of the public. Fourth, the whole process can help the public feel involved in the work and have some sense of ownership.

There are five main stages in PB (Tomášková & Buzková 2020):

1. A call for the public to propose projects
2. Submission of projects for consideration
3. Feasibility assessment of submitted projects
4. Voting
5. Implementing the winning projects

There are several key features in preparing for voting that make PB more likely to be successful. First, in contrast to yes/no referenda, PB involves nuanced choices within the constraints of an overall budget. Where two projects are similar, within a standard rating survey both might be chosen even though their impacts are duplicated. Where votes are elicited through PB, however, voters are more likely to choose one or the other, but not both, based on their comparative contributions related to the value they offer for the budget. This point can be seen in a simulated PB on projects to improve English language education in Thailand (Watson Todd, 2019) where two of the most popular projects involved employing native speaker teachers and employing marginal native speaker teachers (e.g. Filipinos). Although popular, no voter chose to implement both projects. In this way, the complexities of traditional policy making which often involve playoffs between costs and benefits can be accounted for.

Second, given such complexity it is crucial that costs be included at the voting stage (Laruelle, 2021). There are two possible approaches to this (Aziz & Shah, 2020): discrete PB where a project is either fully implemented with a fixed budget or not implemented at all, and divisible PB where projects can be implemented to a degree on a sliding budget. Generally, discrete PB is easier to implement and more intuitive even if it lacks the flexibility of divisible PB.

Third, a system needs to be set up to process the voting results to allow for an acceptable selection of projects to be implemented. The most straightforward and intuitive system is knapsack voting (Goel et al., 2019) where projects are ranked in order of the votes received and the projects to be implemented are identified by following this rank order until the budget is exhausted.

PB provides a fairly practical way to implement participatory democracy with numerous potential

benefits. For these reasons, PB has become a valuable tool for municipal councils. However, PB has rarely been practiced outside of these local government contexts, yet its benefits should also accrue to institutional budgeting. This paper examines the application of discrete PB with knapsack voting at a Thai university to select projects related to the environment and sustainable development goals.

Sustainable projects in higher education

With the United Nations setting up the Sustainable Development Goals (SDGs) in 2015 and with the introduction of the UI Greenmetrics university rankings (Atici et al., 2021), many universities have started working towards making their campuses environmentally sustainable and socially inclusive (Mori Junior et al., 2019). Generally, this involves conducting research into sustainability, raising awareness of sustainability, and implementing projects to increase the sustainability of campus operations.

While laudable, there is some evidence that projects to make campuses more environmentally friendly encounter resistance especially if the projects are imposed in a top-down fashion by the administrators or by external organizations (Daub et al., 2020). There is also the potential for a disjunct between implementing a campus project and raising awareness with little integration between the two goals.

This paper presents a case study of how PB can be used to integrate implementing projects and awareness-raising through bottom-up implementation of sustainability projects. The case study concerns an undergraduate course at a Thai university where students created projects for increasing campus sustainability (with the potential benefits of innovativeness and relevance to users). University members were then invited to vote for the projects they would like to see implemented within a fixed budget, raising their awareness and hopefully creating a sense of involvement and ownership. Finally, the projects were implemented and their effects are currently being evaluated. In this paper, the focus is on the impact of being invited to participate in decision making by voting on the projects through PB with the following research questions:

1. What was the basis of participants' project selection in PB?
2. How did participants feel about taking part in PB?

The context

The case study described in this paper took place at a well-respected Thai technological university. Although ostensibly a democracy, the Thai political system exhibits characteristics associated with autocracy with the military and elites fostering an authoritarian civil society which limits opportunities for true participatory democracy (Sombatpoonsiri, 2020). Rated on Hofstede's (2011) six dimensions of culture, Thailand is notable for exhibiting very high power difference (Buriyameathagul, 2013). As a consequence, much decision making in Thailand is top-down, and this also applies in education where authorities generally exert strong control and often make policy decisions with little or no input from the public (Watson Todd & Darasawang, 2021). It is therefore rare for students and junior staff members at Thai universities to have a say in the university's policies and projects.

To run the participatory budgeting project, an existing general education course called 'Humans and the Environment' was adapted. The course is an elective course for third- and fourth-year students of science and engineering and runs for 15 weeks with three contact hours per week. The course outline is shown in Table 1. 35 students joined the course in two sections and, given the loose pandemic regulations at the time, the course used blended learning with students only coming on campus when it was essential. The research received ethical approval (KMUTT-IRB-2022-1214-026) and consent was obtained from all participants.

Week	*Teaching focus*
1	Introduction: Overview of the course; introducing issues of climate change, environment and sustainability; introducing SDGs and Green University metrics
2	Students present previous environmental and sustainable innovations implemented at universities around the world
3	Presentation on the university's current environmental and sustainable projects and needs; criteria for student projects
4	Students (in groups of 3) present proposals
5	Guidance on budgeting including how to estimate budgets and how to claim reimbursement
6	Students write and submit their proposals in 3 formats 1 Brief 2-paragraph overview covering the origins of the proposed project and the problem it solves 2 Extended proposal including justification and budget 3 One-minute video presenting their proposed project
7	Creation of online tool; voting for participatory budgeting
8	Announcement of winning proposals; assigning non-winning students to groups
9	Specific guidance on how to plan and implement their project
10	Project implementation
11	Project implementation
12	Project implementation
13	Project implementation
14	Project implementation
15	Project reporting

Table 1. Course outline of the participatory budgeting course

Overall, the project follows the five main stages of PB (Tomášková & Buzková 2020) with weeks 1 to 5 acting as the call for proposals and week 6 the submission of proposals. The voting was conducted in week 7 with the rest of the semester devoted to implementing the winning projects. Conducting the whole PB process within a single semester meant that there were severe time constraints with the consequence that projects could not undergo formal feasibility assessment before the voting. The audience for the students' proposal presentations, however, included a staff member from the Buildings and Grounds department of the university and a teacher of environmental science who gave informal feedback.

In creating their projects, the students worked in groups of three and aimed to design projects meeting the following criteria:

- The project should have a high likelihood of having a positive impact on the environment or other sustainability issues at the university.
- The project should address the Green University metrics or be clearly linked to one of the SDGs.
- The project should cost between 5,000 and 200,000 baht ($140 to $5,700).
- The project should be able to be implemented within 5 weeks.
- The project should not require specialized workers to be implemented.

To implement the projects, the students were joined by other students whose proposals had not won acceptance and were guided by a postgraduate mentor studying environmental science and by staff assigned by the Buildings and Grounds department.

The tool for participatory budgeting

The students proposed 12 projects with a total budget of 1,139,332 baht ($32,300) as shown in Table 2. The budget allocated from research funds for the projects was 600,000 baht ($17,000) meaning that there was a need to select which projects should receive funding.

doi.org/10.32388/BKTXZ9.3

Project title	*Budget*
Cover way (to provide shelter for pedestrians)	180,000 baht
Green bike (more bike shelters for bicycle sharing)	44,203 baht
Clean water (drinking water dispensers)	75,500 baht
Smart sprinkler for improving water usage	5,900 baht
Standing exercise bikes for circulating water in ponds	159,095 baht
E-bus booking application	94,340 baht
On-campus wind power generator	161,200 baht
Braille block pavement for the visually impaired	190,975 baht
Solar-powered motion-sensor lights	52,500 baht
Vertical garden bench for absorbing pollutants	25,722 baht
Pool bin for removing refuse from ponds	16,827 baht
Green pocket garden	133,070 baht
Total	**1,139,332 baht**

Table 2. The projects proposed by the students

To promote participatory democracy in selecting the projects to be implemented, an e-voting system was used and all members of the university (students and staff) invited to vote. For effective PB, the e-voting tool needs certain characteristics. First, the tool needs to follow the process criteria of effective participatory methods of Winz and Brierley (2007). These are accessibility, task definition, and structuring the decision-making process. For accessibility, using e-voting is convenient and practical (especially under pandemic restrictions) and all university students and staff have access to the Internet. For task definition, the initial instructions must be clear (the initial page in the PB tool includes the purposes of the tool, brief guidelines on how the tool works, and details of the stages respondents will be asked to complete) and the website should be reasonably intuitive to use. For process structuring, the consequences of each decision need to be clearly shown. Second, as a broad principle of participatory democracy, enough information to guide voters in making rational decisions is needed (McGee, 2009). Third, for effective PB, clear budget considerations, such as exact costs of each project (i.e. discrete PB), need to be highlighted (Laruelle, 2021).

The website for PB voting (https://sola.pr.kmutt.ac.th/gump) was designed following these criteria. The initial page provides a brief description of the task to elicit respondent consent with the next page providing a more extended description for task definition. Respondents are then provided with information about the 12 projects consisting of the brief 2-paragraph overview of the proposal and an embedded video with the costs clearly stated. The respondents can then choose projects to be funded. For each project they choose, the total budget of 600,000 baht is reduced by the project costs and the remaining budget shown (see Figure 1; the website is a Thai-language website, the same procedures and interface for an English-language website on educational policy can be found at https://sola.pr.kmutt.ac.th/meg/). There are several hundred different ways of combining projects within the budget, so it is essential that decisions can be revised easily and respondents are asked to confirm their final selection.

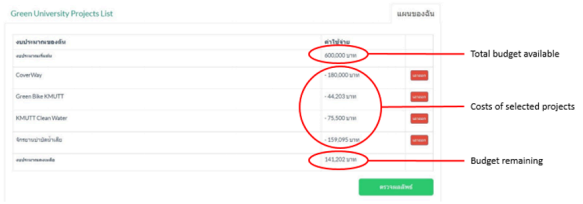

Figure 1. Snapshot of the interface showing budget use

The results of the project selection from the website were ranked in order of popularity and seven projects identified through knapsack voting to be implemented. One project (Braille block pavement for the visually impaired) was initially selected but was deemed an inappropriate design by a university committee, leaving six projects to be implemented:

- Clean water (drinking water dispensers)
- Smart sprinkler for improving water usage
- Solar-powered motion-sensor lights
- Vertical garden bench for absorbing pollutants
- Pool bin for removing refuse from ponds
- Green pocket garden

It should be noted that projects with low costs, such as the smart sprinkler project, are more likely to be selected since the majority of respondents attempted to use as much of the budget as possible. 55% of respondents used at least 500,000 baht of the 600,000-baht budget available, and there is some evidence that these respondents chose lower-cost projects as a way of using up as much budget as possible. Looking at the sequence in which respondents chose projects and focusing on the smart sprinkler project, the project with the lowest cost, this was chosen as one of the last two projects in 42% of cases where this project was chosen. The expected proportion of choosing the smart sprinkler project as one of the last two projects if the sequencing of chosen projects were random is 22% giving an observed-to-expected ration of 1.91 which implies that some respondents may have been choosing lower-cost projects as a way of maximizing their use of the budget. It is also worth noting that the smart sprinkler project is the only project which was chosen at clearly different rates by the various groups of respondents with academic staff more likely to choose this project. This suggests that more knowledgeable respondents may be more likely to try to maximize their use of the budget although this point warrants further research.

Data collection

After respondents confirmed their selection of projects to be implemented, three follow-up questions were asked. The first was demographic asking if the respondent was a student, an academic staff member, or a support staff member. The second open-ended question asked respondents about the basis or principles of their decision making while selecting projects. The third open-ended question asked respondents about their feelings in taking part in PB. The responses to these last two questions provide the data for this study to answer the question 'How do university members react to taking part in participatory budgeting to select student-generated environmental sustainability projects?'

Of the 342 people who voted, 254 provided responses to the second question about the basis of decision making (34 academic staff members, 29 support staff members, 186 students, and 5 others) and 226 provided responses to the third question about their feelings towards PB (31 academic staff members, 25 support staff members, 165 students, and 5 others).

Data analysis

Given the size of the data, initially the responses were treated as two corpora (one for each question) to identify frequent content words in the responses and the collocations of these words. Since the data was in Thai which does not put spaces between words, first the data was segmented into words using the Lexto Thai Lexeme Tokenizer (http://www.sansarn.com/lexto/). The results were checked manually and abbreviations replaced by full forms (for example, 'university' in Thai can be referred to as 'ม.', the first letter of the Thai word so this was changed to the full form). The resulting corpora were analyzed using AntConc (Anthony, 2019). This allows the identification of the prevalent themes appearing throughout the responses. Based on these themes, quotations providing insights into respondents' thinking are presented qualitatively.

Results

The basis of participants' project selection in PB

The top ten content words by frequency in the responses to the question about the basis of decision making are shown in Table 3 (as the Thai word, its English translation, its most frequent collocations, and a sample quotation). The most frequent words show

doi.org/10.32388/BKTXZ9.3

that the respondents used several different bases for their decision making with the likelihood of a project solving a problem in reality and value for money being the most common themes. It is worth noting that there were clear differences in the frequency of using these words between the various groups of respondents for only two of the words. Academic staff were more likely to use 'likelihood', while students were more likely to use 'convenience'. This suggests that students may be concerned about the personal impacts of the projects, although only a small proportion of all student respondents talked about 'convenience'. Many of the respondents appeared to take a nuanced view seeing their decisions reflecting a playoff between the seriousness of the problem, the potential benefits and the costs. Typical responses to the question about the bases for decision making include:

> "Projects that are of maximum benefit to the students and personnel of the university and that aim to reduce environmental pollution."
>
> "Projects that use a budget which is not excessive and which can be used for real improvements within the university"
>
> "I made decisions based on the issues with real impacts based on the number of people affected, and on whether the project can actually save energy or reduce pollution."

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Thai word	*English translation*	*Freq.*	*Typical uses/collocations*	*Sample quotation*
ประโยชน์	benefit, use	122	public benefit, real benefit	“Projects that directly benefit students”
จริง	true, real	63	do it for real, real use	“The project can be implemented into reality”
งบประมาณ	budget	32	suitable budget	“Is the budget in line with the nature of the project?”
ปัญหา	problem	31	current problem	“The problem solved is a problem that should be solved”
ความเป็นไปได้	likelihood, possibility	23	high likelihood	“See the possibility of making the work come out as a real work”
ส่วนรวม	public	17	public benefit	“The project has a large impact on the public, not just on a small group”
ความคุ้มค่า	value, worth	16	worth the budget	“The project is worth the investment”
ความจำเป็น	necessity	16	a necessity for the university	“Is it necessary to create this project?”
ความสะดวก	convenience	14	something that increases convenience	“Because it will increase convenience and help make it safe for everyone”
สิ่งแวดล้อม	environment	14	improve the environment	“Choose projects that focus on environmental development - Focus on projects that save energy”

Table 3. Frequent content words concerning bases of decision making

doi.org/10.32388/BKTXZ9.3

Thai word	*English translation*	*Freq.*	*Typical uses/collocations*	*Sample quotation*
ดี	good	72	feel good	"It felt good to be part of the decision to make a good project"
รู้สึก	feel	66	feel good, feel happy, feel proud,	"I feel that the university is open to listening to opinions from people"
โครงการ	project	66	choose a project, this project	"Glad to be a part of this project that makes the environment better"
มหาวิทยาลัย	university	53	develop the university	"It's nice to see something new in the university"
ส่วนหนึ่ง	take part	44	good to take part, happy to take part	"Glad to be part of your budget and money management decisions"
ดีใจ	happy	42	happy to take part	"Happy to be a part of co-developing the university"
นักศึกษา	student	37	students' views, opportunity for students	"We are delighted that the university gives students the opportunity to participate in improving our quality of life"
จริง	true, real	32	really happen	"Thank you if these projects really happen"
พัฒนา	develop	32	develop the university	"It feels good to use your own voice to develop a university"
มีส่วนร่วม	participate	30	happy to participate	"It's very good for students to participate in decision making"

Table 4. Frequent content words concerning feelings about taking part in PB

In addition, some respondents showed a depth of understanding and thoughtfulness by highlighting other concerns in their decision making including the need for long-term thinking ("must take into account the maintenance of the whole system for long-term use after the completion of the project"), the potential for the project to only have face value ("it must be sustainable and not just green washing"), and the possibilities of additional benefits from the projects ("Do something new – an innovation to create a selling point for the university"). Very few respondents took a self-centered approach to their choices ("I myself have benefited and think that if it really happens, life would be more comfortable"). Overall, the PB tool appears to promote a community-oriented, thoughtful and nuanced approach to choosing projects.

The participants' feelings about taking part in PB

The most frequent content words used in responses to the third question about feelings in taking part in PB are shown in Table 4. The sample quotations illustrate the consistent positivity in the responses. This is confirmed by looking at the collocates of *รู้สึก* (feel). The most frequent collocates are *good*, *happy* and *proud*, while the strongest collocates (measured by Mutual Information (a measure of strength of collocation) are *impressed*, *excited* and *honored*. The only clear difference in frequency of word usage between the various groups of respondents is that the students, the least empowered group, was most likely to use 'participate'. Overall, 92% of responses show positive feelings towards being asked to participate in PB. Typical responses to the question about feelings towards PB include:

> "I am delighted to be able to vote this time for the sustainable development of the university."
>
> "It's a very good activity that allows people who are actually experiencing the problems to participate and share their opinions."
>
> "Glad to be part of the voting and to have made good use of my vote. I am delighted

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> that the university gives students the opportunity to participate in improving the quality of our lives."

Some responses highlight broader implications of using PB, arguing that the process could be "used as a model for external social development" and linking PB to participatory democracy:

> "Everyone should have the right to express their opinions and to make choices about the development of their own educational institutions. Thank you for showing the rights that should be used in this democratic country."

One respondent even argued that PB could lead to changes in social media use:

> "I want everyone to be more involved with the things around us. Nowadays Thai people ignore matters that are important to the lives of many people including themselves and focus on the gossip news that is not useful. If everyone joins in voting, the outcome will meet everyone's needs."

Two respondents felt that PB was not necessary as the process usurped traditional responsibilities:

> "I feel that some projects should not have been selected, because it is the main task of university departments to take care of these things."

Nevertheless, such feelings were clearly unusual with the vast majority of respondents seeing PB as very beneficial.

Discussion

Before discussing the implications of using PB for selecting environmental and sustainable projects, there are three limitations that need acknowledging. First, at the time when the PB website was being promoted to encourage public participation, the university PR system had problems so that the proportion of university members who participated was not as high a proportion as hoped. Second, for projects involving online participation, there can be issues of self-selection by participants meaning that only people who are already interested participate which can lead to biased results (Schaurer & Weiß, 2020). In this case, people already interested in environmental sustainability may be more likely to participate. However, as the research focuses on reactions to PB and the participants had no previous experience of PB, I believe the results are still valuable.

Third, while a key rationale in setting up the PB website is to promote participatory democracy, it can be argued that conducting non-deliberative self-selected PB as in this case study is not enough. PB empowers the public and ensures that decision making is based on the public's choices, but PB in itself may not be enough to generate full awareness of issues or to create a democratic community. He (2019) argues that the kind of PB presented in this case study needs to be supplemented by deliberative polling where members of the public deliberate and discuss together forming a community. PB, then, could be seen as a preliminary stage in the move towards full participatory democracy, and the next iteration of PB in this context could include a medium whereby voters can deliberate together in reaching the final decision about projects to fund.

The results show an overwhelmingly positive response to using PB in policy making and suggest that using PB in educational institutions may be a useful first step on a journey towards greater participatory democracy. The main goals of PB (innovation, awareness, and involvement) appear to have been achieved. First, although some projects (e.g. solar-powered motion-sensor lights) are standard environmental practice, other projects, such as the pool bin for removing refuse from ponds, are more innovative and less likely to have been suggested without student input. Second, raising awareness of environmental and sustainability issues has become a common goal both in educational institutions and in wider society. The thoughtful and community-oriented nature of the bases for selecting projects implies a depth of consideration of environmental issues by many of the participants suggesting that PB should be added to the existing toolbox of approaches to raising environmental awareness, although the addition of a further stage of deliberative polling may be even more beneficial. Third, the positive reactions of participants to being invited to

take part in PB, perhaps especially feelings of pride and honor, imply a sense of involvement in the projects.

For those wishing to initiate PB in their own contexts, there are several key considerations. First, there needs to be a broad objective that can be addressed through numerous small projects (in this case, improving environmental sustainability at the university). Second, a pool of participants with sufficient knowledge and willing to propose projects is needed (in this case, the students taking the course). Third, experts are needed to judge the feasibility and validity of the proposed projects (in this case, the environmental science teacher and staff from the Buildings and Grounds division of the university). Fourth, a reasonable budget needs to be allocated for implementing the projects (in this case, the budget came from research funds, but many universities allocate a budget for improving environmental sustainability, part of which could be used for PB). The final consideration is designing a web-based tool to collect votes. As the tool needs to show how a voter's choices relate to the budget available in real time, the web design is a fairly straightforward but non-trivial task requiring reasonably skilled web programmers. Although implementing PB in educational institutions for environmental sustainability requires preparation, coordination between university departments and the allocation on budget, the potential benefits of PB make it a potentially valuable tool for promoting both democratic values and sustainability.

Acknowledgements

This work was supported by Thailand Science Research and Innovation (TSRI) Basic Research Fund: Fiscal year 2022 under project number FRB650048/0164. I am also grateful to the two teachers, Chanen Munkong and Passanan Assavarak, to Stuart G. Towns for help with the website, and to Punjaporn Pojanapunya for assistance with the Thai-language corpus analysis.

Declaration of interest

There are no competing interests to declare.

Biographical note

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Declarations

Funding: No specific funding was received for this work.
Potential competing interests: No potential competing interests to declare.