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The Role of Zero Waste Learning Classes in Shaping Environmental Behavioral Change and Collective Identity

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Keywords

Zero waste, Behavior change, Collective identity, Grassroots

Abstract

This study analyzes the role of the Zero Waste Learning Class (Kelas Belajar Zero Waste/BZW) in shaping environmental behavior change and collective identity through community-based environmental education. A qualitative phenomenological approach was employed to explore the lived experiences of 14 BZW alumni as part of a grassroots sustainability movement. Data were collected through in-depth interviews, participant observation, and analysis of community documents, and analyzed using thematic analysis guided by the Theory of Planned Behavior, Maslow's Hierarchy of Needs, and Collective Identity Theory. The findings show that participation in BZW promotes gradual and sustained pro-environmental behavior change, influenced by positive attitudes toward zero waste practices, strengthened community social norms, and increased perceived behavioral control through practical learning processes. This process also fosters a shift in motivation and values from individual concern to collective ecological responsibility. The study concludes that the Zero Waste Learning Class functions as a transformative learning environment that contributes to the development of ecological citizenship at the community level.

INTRODUCTION

The waste crisis in Indonesia has become an urgent issue within the context of environmental preservation and public health. One of the primary causes of this problem is environmentally unfriendly public behavior, including indifference towards waste sorting and management. The suboptimal waste management in Indonesia is attributed to community behavior and the ineffectiveness of government-implemented systems, leading to widespread waste burning or indiscriminate disposal (Syarif et al., 2022). This condition creates an unsustainable cycle of environmental degradation, necessitating more intensive education and campaigns to raise public awareness regarding the importance of waste management.

One effort to increase public awareness about the importance of waste management is the emergence of education with the zero waste concept. As problems evolve, the Zero Waste concept has begun to gain attention as a more comprehensive solution. Zero Waste is not merely a waste management strategy but also a philosophy of life that emphasizes community responsibility towards the environment through reducing waste generation from the outset. The old paradigm of 'collect, transport, dispose' has proven unsustainable, making a transformation towards the Zero Waste paradigm urgent (Zulfa et al., 2021). Education and community empowerment based Zero Waste programs have been shown to significantly increase community participation in waste sorting and processing (Erviana et al., 2019; Wirasasmita et al., 2020).

However, the implementation of Zero Waste is not without challenges. Low public awareness and minimal government support remain significant obstacles (Hendra, 2016). Low public awareness will further exacerbate waste management problems, hindering the adoption of environmentally friendly practices such as composting and recycling (Salleh et al., 2022).

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Therefore, effective synergy among the community, government, and private sector is absolutely necessary.

In addition to policy concepts, the role of communities is also a crucial foundation in shaping sustainable behavior. Community-based education has proven capable of increasing knowledge while changing community behavior towards environmentally friendly lifestyles. For instance, campaigns for using tumblers among students successfully reduced single-use plastic consumption, with 93% of students committing to switching to eco-friendly tumblers (Hastomo et al., 2024). The integration of agricultural activities into school curricula also provides students with practical understanding of sustainability (Latifah et al., 2023). Meanwhile, publications on education for sustainable development continue to increase, indicating high attention to environmental issues in higher education (Agustin, 2025).

Community programs based on waste management also yield tangible results. Early education on 3R (Reduce, Reuse, Recycle) has been shown to foster an environmentally conscious mindset in students (Sari & Alfian, 2020). Engaging and collaborative educational approaches can strengthen sustainability values while building a clean living culture through moral and social approaches (Fauzi et al., 2021). Thus, community education functions not only as a means of knowledge transfer but also as a process of internalizing values and shaping attitudes that favor sustainability.

Within the framework of alternative education, the Zero Waste Learning Class (BZW) holds significant relevance. This program runs for 16 weeks and covers theoretical material, practical application, and impact evaluation that can be directly implemented in daily life. The results show significant changes in consumption behavior and waste management among participants (Febiarthy, 2024).

From its inception, the BZW Class has been conducted for free via the WhatsApp and has been attended by over 892 participants from various cities in Indonesia. This program serves not only as a technical education platform but also as a space for forming values, norms, and social solidarity in addressing behavioral change challenges (Alumnia, 2024). The material taught includes strategies for preventing waste generation (reduce), sorting waste by type (sort), and processing organic waste (process) (zerowaste.id, 2018). This approach aims to build strong environmental literacy and encourage sustainable behavioral transformation (Pratiwi, 2023; Zitri et al., 2022).

Furthermore, zero waste practices are significantly influenced by social norms and daily routines (Zhan, 2022). In this context, the BZW Class acts as an arena for social transformation that fosters ecological awareness and shapes collective identity. Sustainability education must encompass spatial dimensions and ecological responsibility so that learning is not merely knowledge transfer but also builds a connection with the surrounding environment (Guaran & Venturini, 2022). Such an approach becomes highly relevant in Indonesia, considering that most studies on zero waste still focus on technical and formal institutional approaches such as campuses or government policies, and have not extensively explored the potential of collectively driven grassroots initiatives (Baba-Nalikant et al., 2023).

Empirical studies show that BZW Class alumni tend to be more consistent in practicing minimal waste behavior, both in households and communities (Febiarthy, 2024). Other findings also indicate that the experience of participating in the BZW class encourages participants to adopt more sustainable lifestyles, such as bringing their own containers when shopping or reusing discarded items (Albiruni, 2021; Mirna, 2021). The systematic curriculum, learning intensity, and active alumni network are key advantages of the BZW Class compared to other environmental communities.

Although research on zero waste is increasing, most of it still focuses on formal institutional contexts such as campuses or government policies (Baba-Nalikant et al., 2023). Studies examining how community-based environmental education can shape sustainable behavior change, ecological motivation, and collective identity are still very limited. This gap is what this research aims to fill. Specifically, there have not been many studies that integrate behavior change theory (TPB), human needs dynamics (Maslow & Green, 1943), and collective identity theory to explain individual and community transformation in the context of the zero waste movement.

Thus, the research gap addressed by this study is the lack of in-depth examination of how community-based environmental education programs such as the BZW Class build behavioral change, ecological motivation, and collective identity through online and participatory social learning processes.

Based on this gap, the objectives of this research are to: 1) identify the behavioral change process of Zero Waste Learning Class participants, 2) analyze the dynamics of motivation and needs that drive these changes, 3) explore how collective identity is formed within the BZW alumni community, and 4) synthesize empirical findings using three theoretical frameworks: the Theory of Planned Behavior, Maslow's Hierarchy of Needs, and Collective Identity Theory. This research is expected to contribute to the development of effective community-based environmental education models and enrich the literature on grassroots sustainability movements.

METHODS

This paper employs a qualitative approach with a phenomenological perspective to explore the experiences of Zero Waste Learning Class alumni as part of a social movement towards sustainability. A qualitative approach was chosen due to its ability to delve into the subjective dimensions of behavioral change and community dynamics, aligning with the view that this approach is superior in understanding social meanings and processes (Syahrizal & Jailani, 2023). The phenomenological approach was used to understand how individuals or groups experience and interpret the Zero Waste Learning Class. Through this approach, participants' lived experiences can be holistically understood. The phenomenological approach yields data in the form of written or spoken words and observable behaviors, which are highly relevant for capturing the nuances of the learning class participants' experiences (Yana et al., 2024). A similar approach was also used in previous studies (Abdussamad, 2021), demonstrating the use of a phenomenological approach to explore subject experiences, where experiences and perceptions are the primary focus of data collection.

Furthermore, the phenomenological approach was used to capture the essence of participants' experiences, while a qualitative descriptive method was used as a framework to analyze data in the form of written or spoken words and observable behaviors (Abdussamad, 2021). This is relevant in the context of the BZW Class, where researchers can draw conclusions based on real interactions and student experiences in various class sessions.

After data collection, analysis was conducted using thematic analysis (Seers, 2012) through coding, theme grouping, and theme review. This analysis was guided by three main theories that served as conceptual frameworks: the Theory of Planned Behavior (TPB) (Ajzen, 1991) to interpret behavioral change patterns, Maslow's Hierarchy of Needs (Maslow, 1954) to analyze motivational dynamics, and Collective Identity Theory (Fauzie et al., 2018) to understand the formation of collective identity among BZW Class participants. The integration of these three theories allows for a comprehensive interpretation of the social transformation processes that occurred.

To ensure the validity and credibility of the data, this study

implemented several credibility testing strategies. First, source triangulation was performed by comparing data obtained from in-depth interviews, participant observation, and analysis of internal community documents to ensure the consistency and reliability of the findings. Second, this study used theoretical triangulation, utilizing three theoretical frameworks—the Theory of Planned Behavior, Maslow's Hierarchy of Needs, and Collective Identity Theory—to interpret the phenomena under study from various psychological and social dimensions, thereby enriching and comprehensively analyzing the data. Additionally, member checking was conducted by reconfirming a number of findings and interpretations with informants to ensure that the generated meanings truly aligned with their experiences and perceptions. Finally, this study applied an audit trail through systematic recording of the research process, including field notes, analytical memos, and interview recording documentation, to maintain transparency and accountability of the data analysis process.

RESULTS AND DISCUSSION

Behavioral Change of Zero Waste Learning Class Participants

In-depth interview results indicate that Zero Waste Learning Class (BZW) participants experienced gradual and consistent behavioral changes. In the initial phase, most informants admitted to having limited understanding of waste sorting and processing. However, after participating in the learning series, they entered an initial awareness stage and began to understand the urgency of reducing waste generation. This change was further strengthened when participants started to develop an intention to practice minimal waste in their households.

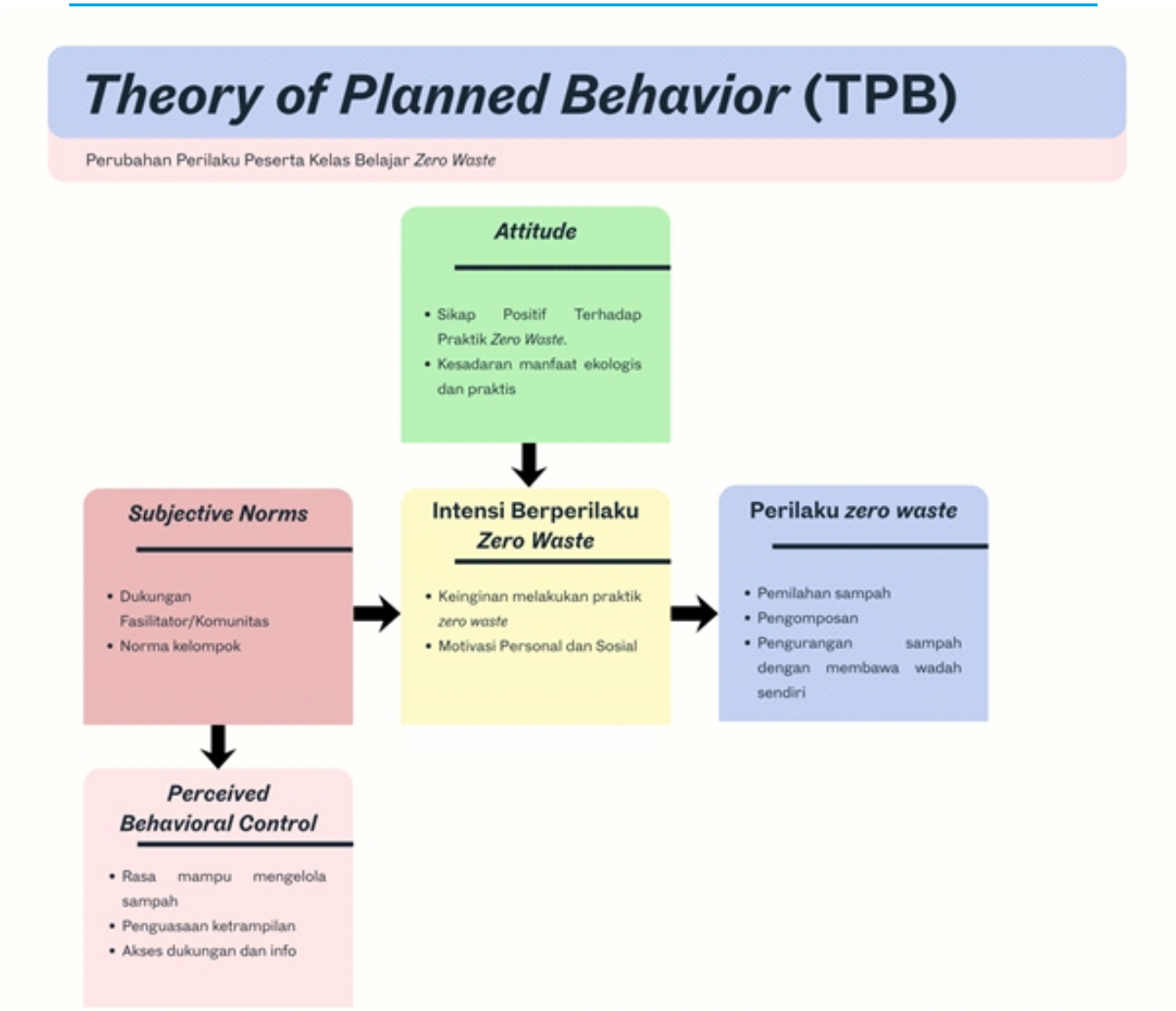
This change process evolved as participants gained direct experience in waste management practices, such as composting and sorting household waste. This stage marks the transition from intention to actual action. One alumnus emphasized the important role of practical experience in triggering behavioral transformation: *"When I joined BZW, it facilitated learning about composting, about managing waste… Previously, I would just separate… in BZW, it was explained from the beginning, the initial understanding." (Alumni Batch 3).*

Over time, some participants demonstrated the ability to maintain these habits consistently, reflecting the maintenance stage of behavior according to the Stages of Change model (Learman, 1998).

These behavioral changes became more apparent when analyzed through the Theory of Planned Behavior (TPB) (Ajzen, 1991). As depicted in Figure 1, participants' behavioral changes are the result of the integration of changes in attitude, subjective norms, and perceived behavioral control, which together form the intention to perform minimal waste actions.

First, participants' attitudes towards zero waste practices became more positive with increased understanding and direct experience in waste processing. Participants found that waste sorting, composting, and plastic reduction were not only easy to do but also had a positive impact on their household environment.

Second, subjective norms played a crucial role in fostering value internalization. Social support from facilitators, active involvement of batch mates, and a culture of sharing practices in WhatsApp groups created social norms that encouraged participants to act in accordance with community values. The presence of facilitator figures also strengthened emotional and spiritual connections to the movement, as expressed by an alumnus: *"Because I've been following Ms. DK for a long time. Why is this person so concerned about waste? And then I also thought, Ms. DK is a lecturer, how could she be brave enough to let go of her position? Being a lecturer is not easy. And then I finally wanted to dedicate my knowledge*



Sumber: Secondary Data Processed, (2026)

Figure 1
TPB of Zero Waste Learning Class Participants' Behavioral Change

to truly serve the community. So, I'm really happy to be part of BZW." (Alumni Batch 9)

Third, perceived behavioral control increased as participants felt they gained technical skills and adequate support to manage waste independently. Learning modules, video tutorials, facilitator guidance, and intensive discussions through WhatsApp groups made participants more confident in implementing zero waste practices. The greater the participants' perceived behavioral control, the stronger their consistency in carrying out minimal waste behavior.

These interview findings are reinforced by secondary data from the 6-Year Reflection Report of BZW Alumni (Wardhani & Oyong, 2024). The report shows that 91.85% of participants experienced changes in household waste sorting habits, and 84.35% began regularly bringing their own shopping containers. This data confirms that behavioral changes did not only occur in a few individuals but were a collective phenomenon within the BZW community. To clarify the relationship between theory and empirical findings, Table 1 below presents a comparison of theoretical components with interview results in this study.

Table 1
Comparison of Theory with Research Findings on Behavioral Change of BZW Class Participants

Theory	Main Concept in Theory	Research Findings (Interview Data)	Connection to Participants' Behavioral Change in BZW
Stages of Change Model (Learman, 1998)	Change occurs through stages: awareness → intention → action → maintenance	Participants initially did not understand sorting-processing concepts, then became aware after initial BZW material, tried composting/waste sorting practices, and maintained these habits.	Interviews show gradual change consistent with the theory, e.g., Alumni Batch 3 initially "just separated" then understood and practiced composting.
Attitude (TPB)	Positive attitudes form when one sees the benefits of behavior.	Participants felt real benefits after practicing composting, sorting, and bringing their own containers; attitudes towards zero waste became increasingly positive.	This attitude change became a strong driver for the intention to consistently practice minimal waste.
Subjective Norms (TPB)	Social norms, group support, and role models influence behavior.	Facilitators, WhatsApp groups, and alumni became sources of support. Ms. DK became an inspiring role model for participants.	Subjective norms strengthened participants' desire to "conform" to zero waste community values.
Perceived Behavioral Control (TPB)	Perception that one is capable of performing a certain action increases intention and actual action.	Participants felt more capable because they received modules, practical guidance, step-by-step instructions, and facilitator mentoring.	Increased sense of capability made participants feel that zero waste practices were not difficult and could be done at home.
Integration TPB	Attitude + Subjective Norm + PBC → Intention → Actual Behavior	Participants showed intention to practice minimal waste behavior, which then transformed into actual actions: waste sorting, composting, BYO, and plastic reduction.	Participants' behavioral changes in BZW can be comprehensively explained using the TPB framework.

Source: Primary Data Processed, (2026)

Conceptually, these changes indicate an integration of increased knowledge, attitude transformation, strengthened social norms, and enhanced perceived behavioral control. This pattern aligns with views emphasizing that environmental behavioral change requires a combination of knowledge, values, and actions (knowledge–attitude–practice model) (Akintunde, 2017). In the context of this research, BZW functions not only as a means of technical education but also as a space for social transformation where participants undergo a gradual and profound internalization of sustainability values.

Thus, the analysis results show that the behavioral changes of BZW participants are transformative, gradual, and supported by the interaction of psychological, social, and structural factors. BZW serves as a good practice example of community-based environmental education capable of building sustainable behavioral change through reflective, participatory, and

empowerment-oriented learning approaches.

Motivation and Needs in the Change Process

Participants' motivation to join the BZW Class is strongly reflected in their subjective experiences during the learning process. In-depth interview results show that participants were not only driven by the desire to change personal behavior but also by the need for a supportive, meaningful, and applicable learning environment in daily life. An alumnus stated: "*The values that are still useful today are many. So, first, the Zero Waste Learning Class really gave a lot of references. I call them references on how to realistically manage waste that can be done at home, that can be done by us easily. Because that's also important. A supportive and sincere environment. Because it feels right, you know, when we are in a community. Connecting, befriending with meaning. Meaningful relationships feel right. That's how it feels, maybe it's also a blessing from there, the network too." (Alumni Batch 8)*

This experience indicates that participants' motivation evolved with their involvement in the community, from mere practical needs to the formation of meaning and social relationships. Furthermore, some participants showed a drive to play a more active role as learning facilitators for others, as revealed by another alumnus: *"Motivation to be a facilitator… So that others can also learn comfortably, focus on learning, just like I did when I learned." (Alumni Batch 12)*

These qualitative findings are reinforced by secondary data from the 2024 BZW Participant Selection Report, which shows that participants' initial motivations were diverse. As many as 37% of prospective participants were motivated by concern for the environment and Earth's sustainability, while 23% were driven by religious values and spiritual motivation. Other motives included self-awareness and healthy lifestyles (16%), social and intergenerational responsibility (14%), and concern and empathy for the environmental crisis (10%), as shown in Table 2.

Theoretically, the dynamics of participants' motivation can be explained through Figure 2, Maslow's Hierarchy of Needs (Maslow, 1954; Maslow & Green, 1943; Mcleod, 2025). In the initial stage, participants' motivation was dominated by safety needs, reflected in their concern for the environment and healthy living. As they became involved in the BZW community, social needs (belongingness) and esteem became more prominent as participants felt accepted and their contributions recognized. Furthermore, some participants moved towards

Table 2
Motivation of Prospective BZW Class Participants 2024

No	Motivation Category	Number of Respondents	Percentage
1	Concern for the environment & Earth's sustainability	185	37%
2	Religious values & spiritual motivation	115	23%
3	Self-awareness, learning, & healthy lifestyle	80	16%
4	Social responsibility, education, & intergenerational	70	14%
5	Concern & empathy for environmental crisis	50	10%
Total		500	100%

Source: Primary Data Processed, (2026)

Sumber: Mcleod (2025)
Figure 2
Maslow's Hierarchy of Needs

self actualization, where they not only practiced a zero-waste lifestyle personally but also sought to realize sustainability values through facilitative roles and collective action. Maslow emphasized that self-actualization is the pinnacle of human motivation when basic needs are met, and individuals are able to realize their potential for higher purposes—in this context, for environmental sustainability (Maslow, 1954).

Thus, the motivation and behavioral changes of BZW participants show a transformative character, where environmental learning does not stop at adopting environmentally friendly practices but evolves into a search for meaning in life and a broader commitment to sustainability.

Formation of Collective Identity in the BZW Community

The formation of collective identity among BZW alumni and participants is clearly reflected in their personal experiences and narratives. In-depth interview results show that involvement in BZW not only shaped individual behavior but also instilled a new social identity recognized in professional and daily social spaces. An alumnus stated:

"I usually say I'm from the Zero Waste Learning community… And people at the office, when it comes to waste, just say to give it to KF." (Alumni Batch 4)

This narrative indicates that the identity as part of the BZW community has been internalized and socially recognized. Additionally, affective commitment to the community also encourages continued participation, as shown by alumni who chose to contribute back as facilitators: *"It's like repaying a kindness… I dedicated myself to BZW… That's why I became a facilitator twice." (Alumni Batch 9)*

These qualitative findings are reinforced by secondary data from the 6-Year Reflection Report of BZW Alumni, which shows that 69% of respondents expressed their willingness to continue contributing to the BZW Alumni Community, and 84.52% reported still being active in the alumni group. This high level of participation indicates that collective identity does not stop at the post-learning phase but continues in the form of consistent social involvement through online and offline interactions, such as WhatsApp groups and regional community activities.

Theoretically, these dynamics reflect the formation of emotional

solidarity as explained in Collective Identity Theory, where shared values function as a symbolic bond that strengthens group cohesion (Fauzie et al., 2018; Fauzie & Matulessy, 2021). In line with this framework, the formation of collective identity is strongly influenced by the level of social cohesion, solidarity, and participatory incentives that encourage the sustainability of collective action (Kristiono & Susilo, 2022). In the context of BZW, sustainability values, emotional support among members, and a sense of empowerment in driving change at local and regional levels are the main foundations for the formation of a strong collective identity.

Shift in Values and Social Orientation

The BZW Class encourages a shift in value orientation from materialistic to ecological. Participants began to view waste management as a moral and spiritual act, not merely technical. "*So about minimal waste, since 2008, I've been reducing plastic bags when shopping. Yes, that was with the information I read that plastic takes hundreds of years to decompose. Just with that one fact, my heart said okay, from now on, I will reduce the use of plastic bags." (Alumni Batch 2)*

This new value forms ecological citizenship, where individuals are responsible for their own consumption and waste. This interpretation aligns with studies showing that value changes in social conservation movements occur through the internalization of collective norms and shared experiences in environmental activities (Fauzie et al., 2018). *"I sell crackers… Automatically use plastic… After knowing BZW, it was like a slap… Astaghfirullah, my cracker business is just me littering… so I stopped selling…" (Alumni Batch 9)*

These findings indicate that community-based education can foster sustainable ecological awareness (Akintunde, 2017), strengthening the connection between the personal and social dimensions of environmental behavior.

Synthesis: Integration of Theory and Field Findings

The findings of this study indicate that behavioral change and the formation of collective identity in the BZW Class are the result of a combination of the Theory of Planned Behavior (TPB), motivation theory (Maslow), and collective identity theory. BZW successfully created a transformative learning environment where knowledge, values, and actions mutually reinforce each other.

The integration of motivational aspects (Maslow), behavioral rationality (TPB), and social solidarity (Collective Identity) makes BZW an effective model for community-based environmental education. This integrative approach across theoretical frameworks is considered capable of providing a more comprehensive explanation while encouraging the formation of sustainable pro-environmental behavior, as recommended in previous studies (Akintunde, 2017).

Empirically, interview and questionnaire data show that the Zero Waste Learning Class: 1) produces real behavioral changes (sorting, composting, conscious consumption), 2) fosters sustained motivation through a sense of community belonging, and 3) Forms collective identity and shared ecological values. Theoretically, these results affirm the effectiveness of an integrative approach between behavioral theory, motivation, and social movements in forming ecological citizenship at the grassroots level.

CONCLUSION

This study concludes that the Zero Waste Learning Class (BZW) plays a significant role in fostering gradual, consistent, and sustainable pro-environmental behavioral change through the integration of attitudes, subjective norms, and perceived behavioral control, as explained by the Stages of Change Model and the Theory of Planned Behavior. These changes are reflected not only in concrete practices such as waste sorting and conscious

consumption at the collective level, but also in deeper transformations of participants' motivation, values, and social identity toward a sense of community belonging, sustainability commitment, and engagement as agents of change. The formation of collective identity within the BZW community strengthens sustained social participation and shared ecological values, positioning BZW as a transformative learning environment that integrates behavioral, motivational, and social dimensions in cultivating grassroots ecological citizenship. Based on these findings, it is recommended that BZW be further developed as a community-based environmental education model by strengthening the role of facilitators as role models, enriching contextual and applicable learning materials, and providing structured post-learning mentoring and alumni networks to support long-term behavior maintenance. In addition, local governments, educational institutions, and civil society organizations are encouraged to adopt and adapt the BZW approach in environmental programs that emphasize not only knowledge transfer but also the formation of social norms, collective identity, and ecological values, while future research is suggested to employ longitudinal or mixed-method approaches to assess the durability of behavioral change and BZW's contribution to broader systemic transformation.

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