The relationship between green behaviour and green campus principles: A literature review

H T Fachrudin¹ and K A Fachrudin²

¹ Architecture Department, Faculty of Engineering, Universitas Sumatera Utara, Medan, Indonesia
² Management Department, Faculty of Economic and Business, Universitas Sumatera Utara, Medan, Indonesia

*Email: hilma@usu.ac.id

Abstract. The green concept has become indispensable in buildings, environments, and campuses. The relationship between green campus and green behaviour is an important thing to research. This research is to review researches related to these matters. The aim is to analyse indicators of green behaviour that can be needed to create a green campus. Green campus has several principles including building, environment, energy conservation, water conservation, waste management, education, and transportation. Green behaviour can be applied to support the realization of a green campus. The method used is a meta-analysis review with meta-ethnography. A total of 17 papers were analysed to construct a new conceptual framework. The stages of analysis in research on green campus and green behaviour were carried out to obtain indicators from each theme. The results of the analysis show that the main principle of the green campus is energy conservation, while the main indicators of green behaviour are awareness, attitude, subjective norms, behaviour control, and intention. The relationship of green behaviour to the principles of green campus is expected to realize a green campus.

1. Introduction
Environmental awareness is a multidimensional construct consisting knowledge of environment, environmental attitudes, and green behaviour [1]. Environmental awareness consists of three components, namely: environmental knowledge, value, and behaviour [2]. Green behaviour can be applied to realize green campus, which consists of several green concepts. The application of green concepts on campus can improve a student's quality of life [3]. The problem is, there is not much research examining the relationship between green behaviour and green campuses.

The focus of this research is to review literatures on the relationship between green behaviour and principles on green campus. Extracting information about indicators of green behaviour in order to create a green campus and the principles of a green campus is also an important thing and becomes a question in this research. This research aims to analyse indicators of green behaviour that can be needed to create a green campus through a review of literatures so that it can be a consideration in developing a green campus design model based on green behaviour by a university. The benefit is that further research can test the model produced by this study to help create the green campus.
2. Method
This research is a literature study on green behaviour and green campus. Reviews of articles are conducted to formulate variables and indicators of green behaviour that can support the realization of a green campus. Primary data comes from various scientific articles. Meta-analysis reviews are used with meta-ethnography to re-analyze the results of previous studies to construct theories and identify relationships between variables. The results of primary study research are re-interpreted to produce new theory [4]. Data were collected from 17 articles from scientific journals. The analysis steps taken are identifying studies with relevant themes, comparing research questions from selected articles, choosing the approach used in the articles, developing concepts by compiling the same theme from different articles, and constructing a new conceptual framework.

![Figure 1. Literature review process](image)

### 3. Results and Discussions

#### 3.1. Green Campus
A green campus is a reflection of the involvement of the entire academic community. Green Campus consists of an education system, research, community service, and environmental friendly locations and involved campus residents in environmental activities and must have a positive impact on environment, economy, and society [5]. A green campus is defined as a campus with an environmental perspective, which integrates environmental science into policies, management, and activities of higher education and has an intellectual capacity [6]. The green campus can be realized by applying seven principles, namely building, landscape, energy conservation, water conservation, waste management, education, and transportation [7]. The principles of green campus based on [8] are divided into six indicators, namely structuring and infrastructure, energy and climate change, waste management, water usage, transportation, and education. A green building strategy can be achieved from five stages of Go Green [9], including reducing resource consumption (energy and water), reducing waste and making recycling efforts, building materials, the environment in buildings, and occupant care/ building users.

#### 3.2. Green Behaviour
According to [10], the tendency of consumers to adopt environmentally friendly consumption behaviours are identified through consumer demographics and psychographics (lifestyle), so that consumers need information about environmental knowledge. The information will help consumers in evaluation of green behaviour and it can provide advice on action strategies [11]. Green behaviour is consumer behaviour carried out in the form of a reflection of consumer attitudes and actions towards environmental protection, namely taking responsibility for the results of their personal consumption or using their purchasing power to campaign for social and environmental change [12].

Based on research by [13] there is an accumulation of knowledge about the impact of altruism, egoism, anthropocentrism, and eco-centrism related to green behaviour. Green behaviour is also referred to as pro-environmental behaviour where each individual minimizes the environmental hazard
through reducing energy use, reducing waste, conserving water, refraining from buying goods that are considered harmful to the environment [14]. The factors that contribute to increasing green behaviour including awareness of ecological and sustainability issues, increasing environmental awareness, and availability of environmental friendly alternative energies [15].

Green behaviour is a component of environmental awareness as recycling behaviour which is defined as a habit that aims to reduce waste by managing waste to become new objects. Green-minded consumers have a principle to reduce, reuse, and recycle a product. Consumers will start reducing the use of plastic like shopping bags or using recycled paper. For consumers who are not recycle waste, may give their waste to organizations that manage waste such as waste banks or plastic collectors [1].

According to[16], green behaviour may be measured by uses knowledge, awareness, attitudes, subjective norms, control behaviour, and intention. Knowledge will be measured through general and subjective knowledge related to the problem; awareness may be observed through environmental problems; attitude will be judged on the level of likes and dislikes about behaviour; Subjective norms will be measured through social pressure received about what behaviour is appropriate and useful; control behaviour will be measured by how their behaviour behaves; intention will be measured by the intensity of the individual to perform the behaviour. There are three variables on green behaviour, namely attitudes, subjective norms, and self-efficacy, which had a significant and positive effect on green behaviour intentions on the principle of energy conservation [17]. Based on [18], the socio-economic realities of households and individuals as well as psycho-social and individual realities do not have a direct influence on the intention to carry out green behaviour on the principle of energy conservation. Consciousness and motives have a relationship to green behaviour. Situational factors that influence behaviour control are very important so that cultural factors, socio-economic constraints have a role to play.

Parker [19], the director of sustainability at Yale University has focused on education and outreach directed to students and faculty in planning a green campus without neglecting all aspects of the sustainability plan such as energy use, transportation, and waste management. Consumers' awareness of the environment affects their willingness to pay premium prices for environmental friendly products. The attitude of environmental awareness also has a significant effect on the level of consumer involvement in consumer product selection. The level of consumer involvement in the process of finding information about environmental friendly products encourages consumers to purchase green products in the future) [20].

The growth of environmental awareness and concern has increased the number of individuals who are proactively involved in the use of environmental friendly products in their daily lives [21]. The increase of environmental awareness through the use of information can foster consumer cognitive attitudes that the products consumed can help reduce the impact on the environment. The environmental care attitude of consumers is influenced by several factors, including education and consumer knowledge about the environment, which is carried out through a simple and healthy lifestyle [10]. Consumers who have environmental awareness are often called a “green orientation” which is predicted to increase in the future. Consumers who have a high awareness of the environment will choose products that are environmental friendly even though the price is relatively more expensive [22].

Green purchase is an environmental friendly behaviour shown by consumers to express concern for the environment [23]. There are 8 conceptual factors that have an impact on green purchasing behaviour, namely environmental knowledge, altruism, environmental awareness, availability of product information and product safety beliefs, point of views of effectiveness, collectivism, transparency, and honesty about business practices [24]. Factors that influence environmental friendly consumption behaviour through consumer decision-makers, consists of external and internal factors [25]. [26] stated that green buying behaviour is influenced by demographics, willingness to pay, religiosity, and psychography. Waste disposal behaviour is influenced by religiosity and psychographic.
3.3. Research Gap
In this research, articles with the theme of green behaviour and green campus were selected to find the relationship of each other. Based on previous researches, several indicators were obtained related to green behaviour and the concept of a green campus. Indicators related to green behaviour include lifestyle, awareness, attitudes, norms, concern, behaviour control, and intention. Meanwhile, indicators for green campuses are building, landscape, energy conservation, water conservation, waste management, education, and transportation (Table 1).

| Building | Environment | Energy conservation | Water conservation | Waste management | Education | Transportation |
|----------|-------------|---------------------|--------------------|-----------------|-----------|----------------|
| Ibtsisem (2010) | Khare (2015) | Kollmuss and Agyeman (2002) | Kollmuss and Agyeman (2002) | Parker (2007) | Parker (2007) | Parker (2007) |
| Green Behaviour | | | | | | |
| Fatmawati & Junaidi (2016) | | Parker (2007) | Relawati et al (2020) | | | |
| Alias et al. (2013) | Lee and Tanusia (2016) | | | | | |
| Gandhe and Pandey (2017) | | | | | | |

Based on Table 1, green behaviour can be applied to the principles of green campus including building, environment, energy conservation, water conservation, waste management, education, and transportation. Green behaviour can be applied to support the green campus principles. Several studies link green behaviour with green principles that can be done to create a green campus.

| Reference | Green Behaviour |
|-----------|----------------|
| Kalafatis et al. (1999) | v |
| Chan (2001) | |
| Laroche et al. (2001) | v |
| Kollmuss and Agyeman | v |
Based on Table 2, indicators of green behaviour consists of awareness [21, 20, 19]; awareness [23, 22]; pro-environment awareness [14]; external and internal factors [25]; lifestyle [10]; responsibility [12]; altruism, egoism, anthropocentrism, and eco-centrism [13]; ecological awareness and environmental awareness [15, 1]; knowledge, awareness, attitudes, subjective norms, behaviour control and intentions [16]; attitudes, subjective norms, and self-efficacy [17]; environmental knowledge, altruism, environmental awareness, environmental awareness, availability of product information and product safety beliefs, views of effectiveness, collectivism, and transparency, and honesty about business practices [24]; attitude [10]; intention, awareness, motive and behaviour control [18]; and trust and psychography [26].

3.4. Key Finding
Based on the review of the literatures, it was found that green behaviour can be applied to all green campus principles, but the most important green campus principle is energy conservation, while for green behaviour, the main indicators are awareness, attitude, subjective norms, behaviour control, and intention. The relationship between green campus and green behaviour can be seen in Figure 2. A total of 17 researches suggest that there is a relationship between the green behaviour and green campus principles. The most dominant linkages are attitudes, intentions, awareness, and norms related to the principles of environment and energy conservation [13], [17], [18].
4. Conclusions
This research focuses on the principles of green campus and indicators of green behaviour. Green behaviour can be applied to all green campus principles. The most dominant research on green behaviour is on the principle of energy conservation. This is due to efforts to save energy use. The main indicators of green behaviour are awareness, attitude, subjective norms, behaviour control, and intention. It is hoped that the green behaviour on these principles can support the realization of a green campus.

Acknowledgement
This research is funded by Research Institution, Universitas Sumatera Utara, according to the research funding agreement letter of TALENTA Universitas Sumatera Utara in the 2020 budget Year Number: 4142 /UN5.1.R /PPM /2020, 27 April 2020.

References
[1] Fatmawati I & Junaedi D K 2016 Antesesden Pembelian Produk Hijau, Jurnal Manajemen dan Pemasaran Jasa 9 (1), 175-185.
[2] Maurer M, Koulouris P, and Bogner, F. X. 2020 Green Awareness in Action—How Energy Conservation Action Forces on Environmental Knowledge, Values and Behaviour in Adolescents’ School Life, Sustainability 12, 955
[3] Tamiami H, Khaira F, Fachrudin A 2018 Green design application on campus to enhance student's quality of life, IOP Conference Series: Material, Science and Engineering, 309
[4] Siswanto 2019 Systematic Review Sebagai Metode Penelitian Untuk Mensintesis Hasil-Hasil Penelitian (Sebuah Pengantar), Buletin Penelitian Sistem Kesehatan, 13 (4), 21312
[5] Mayasari A, Mardyanika Y A P and Sundari T 2016 Studi Perencanaan Pengembangan Kampus Hasyim Asy’ari Sebagai Green Campus, Jurnal Reaktom, 1(1), 1-5
[6] Puspadi N A, Wimala M and Sururi M R 2016 Jurnal Online Institut Teknologi Nasional, 2 (2), 23-35
[7] Fachrudin H T 2020 Green campus concept based on architect perspective, IOP Conference Series: Material, Science and Engineering, 801
[8] UIGreenmetric 2015, Retrieved from http://greenmetric.ui.ac.id/criterian-indicator/
[9] Amstrong P J 2008 Green Design of Residential High-Rise Buildings in Livable Cities, IBS/NAHB Symposium, Orlando, FL
[10] Cruz, M. U. M., & Prabawani, B. 2017 Konsumen Ramah Lingkungan: Perilaku Konsumsi Hijau Civitas Academica Universitas Diponegoro, *Jurnal Administrasi Bisnis*, 6 (1), 39-47

[11] Cheah, I., and Phau, I. 2011 Attitudes Towards Environmentally Friendly Products: The Influence of Ecoliteracy, Interpersonal Influence, and Value Orientation. *Marketing Intelligence & Planning*, 29 (5), 452–472

[12] Martins, H., Ferreira, T., and Miranda, G. 2016 Green buying behaviour and the theory of consumption values: A fuzzy-set approach. *Journal of Business Research*, 69 (4), 1484–1491

[13] Ibtissem, M. H. 2010 Application of Value Beliefs Norms Theory to the Energy Conservation Behaviour, *Journal of Sustainable Development*, 3 (2), 129-139

[14] Kollmuss, A. & Agyeman, J. 2002 Mind the Gap: Why Do People Act Environmentally and What Are The Barriers to Pro-Environmental Behaviour?, *Environmental Education Research*, 8 (3), 239-260

[15] Khare, A. 2015 Antecedents to Green Buying Behaviour: A Study on Consumers in An Emerging Economy, *Marketing Intelligence & Planning*, 33(3), 309 -329.

[16] Alias, R., Hashim, Z., Farzana, N., Mariam, S. 2013 Energy Conservation Behaviour among University Students, *Global Journal of Business and Social Science Review*, 1(2), 127-134

[17] Lee, J. W. C., Tanusia, A. 2016 Energy conservation behavioural intention: attitudes, subjective norm, and self-efficacy. 2016 *International Conference on New Energy and Future Energy System, Series: Earth and Environmental Science* 40

[18] Gandhe, R. J., Pandey, S. C. 2017 A New Age Imperative for Sustainable Development, *Indian Journal of Sustainable*, 3(1), 1-12

[19] Parker, A. 2007 Creating a “Green” Campus, *BioScience*, 57(4), 321

[20] Junaedi, M. F. S. 2005 Pengaruh Kesadaran Lingkungan Pada Niat Beli Produk Hijau: Studi Perilaku Konsumen Berwawasan Lingkungan, *BENEFIT*, 9(2), 189-201

[21] Kalafatis, S.P., Pollard, M., East, R. and Tsogas, M.H. 1999 Green marketing and Ajzenûs theory of planned behaviour: a cross-market examination, *Journal of Consumer Marketing*, 16 (5), 441-460

[22] Laroche, Michel, Bergeron, J., and Barbaro-Forleo, G. 2001 Targeting Consumers Who are Willing to Pay More for Environmentally Friendly Products, *Journal of Consumer Marketing*, 18(6), 503-520

[23] Chan, R. Y. K 2001 Determinants of Chinese Consumers’ Green Purchasing Behaviour, *Psychology and Marketing*, 18(4), 389-413

[24] Kaufmann, H. R., Panni, M. F. A. K. and Orphanidou, Y. 2012 Factors Affecting Consumers’ Green Purchasing Behaviour: An Integrated Conceptual Framework, *Amfiteatru Economic*, 15(31), 50-69

[25] Solomon, M. R., Bamossy, G., Askegaard, S., and Hogg, M. K. 2006 *Consumer Behaviour: A European Perspective (3rd ed.),* Essex: Prentice Hall

[26] Relawati, R., Ariadi, B. Y., Purwono, B. S. A. 2020 The Factors Affecting Green Consumer Behaviour: Evidence from Malang, East Java, Indonesia, *TEST Engineering & Management*, 82, 7560-7570