

JPPIPA 8(4) (2022)

Jurnal Penelitian Pendidikan IPA

Journal of Research in Science Education



http://jppipa.unram.ac.id/index.php/jppipa/index

Green Behavior for Energy Efficiency as a Sustainable Campus Support

Maslikhah¹, Roudlotul Jannah^{2*}, Muna Erawati¹

¹IAIN Salatiga Postgraduate Program, Indonesia
²Hidna Education Salatiga, Indonesia

Received: March 20, 2022 Revised: August 18, 2022 Accepted: September 28, 2022 Published: October 31, 2022

Corresponding Author: Roudlotul Jannah roudlotuljannah0802@gmail.com

© 2022 The Authors. This open access article is distributed under a (CC-BY License)

DOI: 10.29303/jppipa.v8i4.1501

Abstract: In order to make the environment safe and comfortable, humans need to have ethics. With good environmental ethics will make life more meaningful. Ethical towards the environment, among others, by protecting the environment from damage or loss. This study aims to analyze student behavior towards the use of electrical energy in providing sustainable campus carrying capacity. This field research is qualitative with a phenomenological approach to find out the daily, intersubjective world (world of life) of IAIN Salatiga students. This study reveals the meaning of concepts or phenomena of experience based on the awareness that occurs in IAIN Salatiga students in utilizing electrical energy on campus in lighting systems, air systems, and supporting equipment. Data collection techniques through observation, interviews, and documentation. The data that has been obtained is analyzed by reducing, presenting, and drawing conclusions or verification. Checking the validity of the data using triangulation techniques and sources. The results show that the behavior of IAIN Salatiga students is in the form of concern for the use of electrical energy, which includes lighting systems, air systems, and supporting equipment.

Keywords: Green Behavior; Energy efficiency; Sustainable campus

Introduction

Nature is a facility provided by Allah SWT to recognize its creator as well as the creator of humans as natural components in it (Utami, 2014). The universe with all its detailed parts are interrelated with one another (Abdurrahman et al., 2011). Humans in the context of ecology are immanent (one with nature) as part of nature in their ecosystem processes (Mufid, 2010). Mahatma Gandhi in Asmani, (2012) gives the message that the earth provides enough for everyone's needs, but not for the greedy and greedy people. Utilization of natural resources should be balanced with an understanding of the ability of nature to meet the needs of human life. Humans need to be concerned about the environment.

Sudarsono (2017) provide the concept that environmental care and friendliness are the pillars of supporting environmental sustainability. The indicator of a believer is concern for the environment. This is an Islamic theological attitude that gives strict teachings, do not claim to be a believer if you do not have a commitment to care for the environment. Human behavior with the natural environment is a central theme in human ecology. Behavior comes from cognitive, affective, and psychomotor which refers to the rational and emotional nature with physical movements. Rohadi (2011) gives meaning to one's behavior towards the environment into 4 (four) meanings to improve, maintain, ignore, and damage the environment. Good behavior towards the environment is also called proenvironmental behavior or environmental-loving behavior. Pro-environmental behavior means using and spending personal needs such as using electrical energy properly (Park & Ha, 2012). Steinhorst et al., (2015) added that pro-environmental behavior is an attempt to minimize losses and increase profits. As stated by Putra (2019), actions to reduce or minimize environmental damage or improve natural conditions are proenvironmental behavior.

Human interaction with nature sometimes does not just use, manage, or preserve, but even tends to damage the preservation of environmental functions. Maslikhah, (2015) argues that according to the model of human interaction with the environment, a person can play a double role. This means that in addition to providing

How to Cite:

Maslikhah, M., Jannah, R., & Erawati, M. (2022). Green Behavior for Energy Efficiency as a Sustainable Campus Support. Jurnal Penelitian Pendidikan IPA, 8(4), 1677–1685. <u>https://doi.org/10.29303/jppipa.v8i4.1501</u>

opportunities to preserve environmental functions, there is also a tendency to threaten the sustainability of environmental functions. A person's behavior towards the environment does not only give one meaning but also multiple meanings, according to the dynamics that influence human behavior. It can be understood that a person's behavior is dynamic depending on the factors that influence it both internally and externally. The internal factors referred to include the type of race/ancestry, gender, physical nature, personality, talent, and intelligence of religious, social, cultural, and socio-economic education. These factors will play a role in changing a person's behavior towards the environment. Internal and external factors do not stand alone that do not have a relationship with other factors. These two factors are interrelated to give birth to the behavior that is chosen or possessed to show concern for the environment. These factors open the educational process to shape one's behavior. The educational process can guide a person's behavior from what is not referenced to what is expected in order to provide benefits for oneself, others, and the environment. These factors open the educational process to shape one's behavior. The educational process can guide a person's behavior from what is not referenced to what is expected in order to provide benefits for oneself, others, and the environment. These factors open the educational process to shape one's behavior. The educational process can guide a person's behavior from what is not referenced to what is expected in order to provide benefits for oneself, others, and the environment.

The behavior of individuals or organisms does not arise by itself, but as a result of a stimulus that affects the individual. Behavior is a response to a stimulus that can be distinguished between reflexive and non-reflexive behavior. Reflexive behavior is behavior that occurs as a spontaneous reaction to a stimulus that hits humans. Non-reflexive behavior is controlled by the center of consciousness or the brain. After the stimulus is received by the receptor, it is transmitted to the brain as a nerve center, the center of consciousness to get a response through the affector. This behavior includes behavior that can be formed, controlled which can change from time to time as a result of learning.

Human behavior can be controlled or controlled by the individual concerned. Each individual carries out life processes, each of which runs separately and differently with the when interacting environment. The relationship between the individual and the environment will occur in two aspects, namely the Individual physical and social environment. relationships with the environment will be integrated in both types of environment, humans will be controlled or control nature. The social environment is divided into primary and secondary social environments. The primary environment is a social environment that has close relationships between members who know each other well. The secondary social environment is a social environment that marks the relationship of members with one another rather loosely who lack or do not know each other. The influence of the social environment, both primary and secondary, is very complex in individual development. The relationship between the individual and his environment there is a reciprocal relationship, namely the environment can affect the individual, otherwise the individual can also affect the environment (Erawati, 2011).

The environment and natural resources must be maintained in a balanced condition even though nature can lead to homeostasis conditions independently. Kartasapoetra, (2014) describes homeostasis is the maintenance of the balance of a system through automatic adaptation. The automation of adaptation is not without external influences, but remains in the relationship with others, namely ethics that limit and regulate human movement space to maintain the natural and social environment in a harmonious and humanist condition. Luthfi, (2017) Islam regulates various human relationships with themselves, with each other, with nature, with God, and with the natural environment (four dimensions). As a system that regulates human relations, Islam consists of aqidah (moral rules) that are closely related to one another. Islam as a religion that regulates various human lives and livelihoods, basic values and human norms. Religious values are for humans to lead to skills in overcoming and sharpness in reading the signs of the times along with the ability to create a set of values in preserving the environment (Abdurahaman, 2011). These values are closely related to ethics. Sudirman, (2011) argues that ethics is an order of behavior based on a system of values of a particular society as a standard of good and bad. Environmental ethics is a moral principle for the arrangement, management, and utilization of the environment. Ridwan, (2011) strengthen that good environmental ethics will be able to contribute to making behavior more wise and friendly to the environment.

The principle of environmental ethics aims to be used as a guide and guide for interacting with nature. According to Keraf in Maslikhah, (2013) there are 9 principles of environmental ethics, namely respect for nature; responsibility (moral responsibility for nature); cosmic solidarity; compassion and concern for nature (caring for nature); no harm (no harm); living simply and in harmony with nature (simple and harmony); justice (equitable); democratic (democracy); and moral integration (moral integration).

In order to interact with nature, humans need to instill green behavior. Green behavior means that ethics that exist in Islamic norms are implemented in real life in society in order to support environmental care for human needs in the future. Green behavior is a way of living life by placing oneself as an actor who cares about the damage to the earth by reducing the factors that exacerbate the damage to the earth (Team, 2013). Behavior does not only include motor matters such as speaking, walking, but also discusses various functions such as seeing, hearing, and reintroducing emotions in the form of crying or smiling.

Green behavior in this case is the efficient behavior of students in using electrical energy on campus to support a sustainable campus. Green behavior towards the use of electrical energy needs to be formulated by implementing energy efficiency (Panwar et al., 2011). Schmidt and Guerra (2010) stated that efforts to implement energy efficiency can be done by changing attitudes and behavior. Energy is the ability to do work which can be in the form of heat, light, mechanics, electromagnetism chemistry, and (Government Regulation No. 70 of 2009). Electric power is a form of secondary energy that is generated, transmitted, and distributed for all kinds of purposes, but does not include electric power used for communications, electronics, or signals (Ministry of Energy and Mineral Resources, 2012).

Regarding green behavior, Ghani (2012) revealed that a series of green design activities by minimizing the ecological impact and energy are used to obtain security, comfort, safety, and health. Temporary Fox (2012) mentions that 50% of electrical energy is used for room needs related to heating, cooling, and lighting systems. Green behavior as an eco-efficiency effort in the use of electrical energy can obtain these four advantages.

Efficiency is the accuracy of the way of trying and working in running something without wasting time, energy, and costs that can produce usability. In this case, electrical energy efficiency is how to use electric power according to need. The scope for saving electricity consumption is found in state buildings and BUMN, BUMD, and BHMN buildings as referred to in Article 2 letters a and b is carried out through the air system, lighting system; and supporting equipment (Ministry of Energy and Mineral Resources, 2012). Pandey & Vedak (2010) mentions that students bear the responsibility to increase their awareness of the development of science and technology being developed. Savings on the air conditioning system; lighting system energy; and supporting equipment such as LCD, TV, radio tape, lap top, cellphone, and computer; the production process in the form of heating and cooling devices; and the use of primary energy for transportation carried out by students on campus is very meaningful in supporting the chess of dharma energy. The Ministry of Energy and Mineral Resources has socialized Catur Dharma Energi, among others, increasing oil and gas production, reducing imports of fuel oil, developing renewable energy, carrying out energy-saving movements (Ministry of Energy and Mineral Resources, 2013).

Savings in electricity consumption through lighting systems can be done in various ways. These include 1) using energy-saving lamps according to their designation; 2) reduce the use of decorative lights (accessories); 3) using electronic ballast on TL (fluorescent) lamps; 4) set the maximum electrical power for lighting according to the Indonesian National Standard (SNI) for a reception room of 13 Watt/m2 with a minimum lighting level of 300 lUX; 12 Watt/m2 workspace with the lowest lighting level of 350 lUX; meeting rooms, active archive room 12 Watt/m2 with a minimum lighting level of 300 IUX; archive warehouse 6 Watt/m2 with a minimum lighting level of 150 lUX; emergency stairwell 4 Watt/m2 with a minimum lighting level of 150 lux; parking lot 4 Watt/m2 with a minimum lighting level of 100 lUX; 5) use a lamp housing (a reflector that has a high light reflection; 6) adjust the switch based on the area group, so that it is in accordance with the utilization of the room; 7) using an automatic switch using a timer (timer and/or light sensor (photocell) for garden lights, corridors, and terraces; 8) turning off room lights in buildings when not in use; 9) take advantage of natural light (sun) during the day by opening the window curtains sufficiently so that the light level is adequate to carry out work activities; 10) cleaning the lamp and lamp housing (armature) if it is dirty and dusty so as not to block the lamp light (Ministry of Energy and Mineral Resources, 2012). so that it is in accordance with the use of the room; 7) using an automatic switch using a timer (timer and/or light sensor (photocell) for garden lights, corridors, and terraces; 8) turning off room lights in buildings when not in use; 9) take advantage of natural light (sun) during the day by opening the window curtains sufficiently so that the light level is adequate to carry out work activities; 10) cleaning the lamp and lamp housing (armature) if it is dirty and dusty so as not to block the lamp light (Ministry of Energy and Mineral Resources, 2012). so that it is in accordance with the use of the room; 7) using an automatic switch using a timer (timer and/or light sensor (photocell) for garden lights, corridors, and terraces; 8) turning off room lights in buildings when not in use; 9) take advantage of natural light (sun) during the day by opening the window curtains sufficiently so that the light level is adequate to carry out work activities; 10) cleaning the lamp and lamp housing (armature) if it is dirty and dusty so as not to block the lamp light (Ministry of Energy and Mineral Resources, 2012). 9) take advantage of natural light (sun) during the day by opening the window curtains sufficiently so that the light level is adequate to carry out work activities; 10) cleaning the lamp and lamp housing (armature) if it is dirty and dusty so as not to block the lamp light (Ministry of Energy and Mineral Resources, 2012). 9) take advantage of natural light (sun) during the day by opening the window curtains sufficiently so that the light level is adequate to carry out work activities; 10) cleaning the lamp and lamp housing (armature) if it is dirty and dusty so as not to block the lamp light (Ministry of Energy and Mineral Resources, 2012).

Ways to save electricity consumption through the air conditioning system are by 1) using energy-efficient AC (inverter technology) with power according to the size of the room; 2) using a hydrocarbon type refrigerant; 3) placing the AC compressor unit in a location that is not exposed to direct sunlight; 4) turn off the air conditioner when the room is not in use; 5) install a room thermometer to monitor the room temperature; 6) regulate the temperature and relative humidity according to the Indonesian National Standard (SNI), namely: a work space with a temperature ranging from 240 C to 270 C with a relative humidity between 55% (fifty five percent) to 65% (sixty five percent); transit rooms (lobby, corridor) with temperatures ranging from 270 C to 300 C with relative humidity between 50% (fifty percent) to 70% (seventy percent); 7) operate central air conditioner: 30 (thirty) minutes before unit working hours; the AC fan is turned on, an hour later the AC compressor unit is turned on; 30 (thirty) minutes before the end of working hours the AC compressor unit is turned off, at the end of the working hours the AC fan unit is turned off; 8) ensure that no outside air enters the air-conditioned room which reduces the cooling effect; 9) perform periodic maintenance according to the manufacturer's guidelines; using certain types of glass that can reduce the heat of the sun that enters the room but does not reduce natural lighting; reducing the air temperature in or around the building by planting plants and/or making water pools (Ministry of Energy and Mineral Resources, 2012a-b). an hour later the AC compressor unit was turned on; 30 (thirty) minutes before the end of working hours the AC compressor unit is turned off, at the end of the working hours the AC fan unit is turned off; 8) ensure that no outside air enters the air-conditioned room which reduces the cooling effect; 9) perform periodic maintenance according to the manufacturer's guidelines; using certain types of glass that can reduce the heat of the sun that enters the room but does not reduce natural lighting; reducing the air temperature in or around the building by planting plants and/or making water pools (Ministry of Energy and Mineral Resources, 2012a-b). an hour later the AC compressor unit was turned on; 30 (thirty) minutes before the end of working hours the AC compressor unit is turned off, at the end of the working hours the AC fan unit is turned off; 8) ensure that no outside air enters the air-conditioned room which reduces the cooling effect; 9) perform periodic maintenance according to the manufacturer's guidelines; using certain types of glass that can reduce the heat of the sun that enters the room but does not reduce natural lighting; reducing the air temperature in or around the building by planting plants and/or making water pools (Ministry of Energy and Mineral Resources, 2012a-b). 8) ensure that no outside air enters the air-conditioned room which reduces the cooling effect; 9) perform periodic maintenance according to the manufacturer's guidelines; using certain types of glass that can reduce the heat of the sun that enters the room but does not reduce natural lighting; reducing the air temperature in or around the building by planting plants and/or making water pools (Ministry of Energy and Mineral Resources, 2012a-b). 8) ensure that no outside air enters the air-conditioned room which reduces the cooling effect; 9) perform periodic maintenance according to the manufacturer's guidelines; using certain types of glass that can reduce the heat of the sun that enters the room but does not reduce natural lighting; reducing the air temperature in or around the building by planting plants and/or making water pools (Ministry of Energy and Mineral Resources, 2012a-b).

Ervianto (2012) argues for saving electrical energy in the air conditioning system by setting the AC temperature at an ideal temperature of 240-260C. For every 1 degree Celsius decrease in AC, electricity consumption will increase by 6%. Users can clean the condenser, filter and AC coil regularly, because a dirty air conditioner can consume more electrical energy.

Savings in electricity consumption on supporting equipment, namely by 1) operating an elevator with a stop every 2 (two) floors; 2) using speed control devices and motion sensors on escalators; 3) turn off the computer when leaving the workspace for more than 30 (thirty) minutes; 4) turn off the printer when not in use and only turn it on just before printing; 5) use a copier that has a standby mode with low power consumption; 6) operate audio-video equipment as needed; 7) turn on the water heater and dispenser equipment a few minutes before use and turn it off after use; 8) improve the power factor of the electric power grid by installing a capacitor bank;

The use of electrical energy on campus with various interests such as lighting, air conditioning, and the burden of using computers and other equipment. The behavior of saving electrical energy is something that needs to be done by enforcing policies to turn off lights, limit use, and reduce the burden of electricity usage found in several places on campus that are no longer used (Zunake and More, 2012).

The wasteful use of electrical energy will damage the natural environment. Destructive behavior towards natural resources and the environment that is carried out periodically will result in reduced electrical energy resources. Islam teaches to live frugally as stated in the Koran. The Qur'an has a beautiful way of directing people not to get caught up in the habit of living extravagantly. Humans will only get a loss for themselves with their extravagant nature. Allah SWT really hates people who are wasteful in their daily behavior. Allah SWT calls people who are wasteful and like to squander wealth as people who are friends with Satan who can lead to misery (Al-Isra' verse 27). As stated in the Presidential Instruction of the Republic of Indonesia number 13 of 2011.

From the results of periodic observations and preliminary interviews, some equipment in the lighting, air conditioning, and supporting energy systems were found to be not being used properly. These tools are left on when they are no longer needed. For example, air conditioner (AC), fans, electronic equipment such as computers, printers, projectors. Even on holidays, the curtains look closed. Some of the lights that were on during the day were simply ignored. Student behavior by allowing these conditions to continue without being followed by self-reflection on the burden of the institute and the phenomenon of the energy crisis in various regions.

This research which aims to analyze student behavior towards the use of electrical energy in providing a sustainable campus carrying capacity is important. The benefit is to provide good learning for students in the IAIN Salatiga environment. In addition, the results of this study have implications for efforts to support the government's program on chess dharma energy. The IAIN Salatiga campus is designed to fulfill the dimensions of a green campus (GC) which includes green place, building, and behavior. Green Place marks the existence of green open spaces, water absorption, garbage, and wastewater disposal treatment, installations, locations that are easily accessible, and one stop service. In regards to thatHoff (2012) explain that the contribution made by universities is by dynamically inviting the academic community to form a community that is willing to jointly build a sustainable campus; secondly promote environmental protection.

Sustainable campus according toAbd Razak, et al., (2011) is a campus that utilizes natural resources and the environment (SDA/L) in a sustainable manner; Gobinath et al., (2010) argued that a sustainable campus is a campus that utilizes natural resources/L to future generations with a good, healthy, and safe quality of the environment. Temporary Otto & Wohlpart (2009) explained that sustainability means a balance with the environment and the universe. Whereas Posner & Stuart (2013) argues that creating a good interaction between students and institutions in environmental management. Alshuwaikhat & Abubakar (2008) and Dahle & Neumayer (2001) explained that environmental damage on campus was caused by education, research, and community service activities. Students with their academic dynamics can present problems of electrical energy, waste, water, air, and transportation in this modern era.

Method

This research is a qualitative field research with a phenomenological approach. Data collection techniques used include observation, interviews. and documentation. Interviews were conducted with several students from various faculties at IAIN Salatiga, namely from campuses I, II, and III. In the observation technique, researchers witnessed directly the activities of students who showed behavior towards the use of electrical energy. The behavior in question is the use of energy in light systems, air conditioning, and supporting equipment in academic and student activities. Among the documents obtained were legal documents related to the topic of the study accompanied by the archives of the IAIN Salatiga strategic plan. Activities in qualitative data analysis are in the form of data reduction, data display, and conclusions or verification. Researchers reduce data in the form of summarizing activities, choosing the main things, and focusing on the things that are important. Not only that, researchers look for themes and patterns so that they can provide a clearer picture to facilitate further data collection. The presentation of data in addition to using narrative exposure also uses tables. To support the validity of the data used triangulation techniques and sources.

Result and Discussion

Student Behavior towards the Use of Electrical Energy on Campus

1. Lighting System

There are various student behaviors in the use of electrical energy in lighting systems in academic and student activities. From the results of the interview, it can be explained that the informant used the lights in the lecture room according to the needs at that time. In lecture activities, students start turning on the lights if they feel needed, namely when the room conditions are getting dark (Mau, IAIN Salatiga student). Another student stated, "When I turn on the lights in class, only one switch I turn on, in one parallel light switch for several fluorescent lights, I feel that it is enough to illuminate one lecture hall, so I don't need all the buttons to be turned on if the switch is turned on one. already six neon lights are on because in one box there are two lights, and in one button there are three light boxes which will light up in a row" (Kho). On the other hand, there are students who take the initiative to turn off the lights in several places even though it takes a long time to go around room by room (Ikh, Iwa, & Giw).

The behavior of IAIN Salatiga students in the use of electrical energy in the lighting system is categorized as caring. The behavior of using lights as needed is

Jurnal Penelitian Pendidikan IPA (JPPIPA)

evidence of a caring attitude towards saving electricity consumption on campus. Turning on only one switch means an effort to reduce waste. This is an effort to carry out the instructions of the President of the Republic of Indonesia and as a form of embodiment of the chess dharma energy that has been socialized by the Ministry of Energy and Mineral Resources. It was further explained that the recommendation for an opportunity to increase lighting energy efficiency was one of them, namely turning on the lights as needed(Mulyadi et al., 2013). In addition, acting frugally is a religious recommendation as explained in the Koran (Al-Isra, 27). This caring behavior is one of the principles of environmental ethics that Keraf in Maslikhah (2013) named with caring (caring for nature).

In addition to acting to turn off lights that are not used, some students provide solutions. Among them provide an opportunity for the room to get lighting from the sun. By opening curtains and windows, light energy sources can be obtained to replace lamps (Far, Mei, & Lat). The use of light from outside indicates a student strategy as a form of awareness to save electrical energy. The behavior of students who opened the curtains and windows took advantage of natural light. It was by Fitriani & Astuti (2016) called natural lighting, one type of lighting usually comes from windows, glass doors, walls, and skylight that comes from sunlight.



Figure 1. The windows and curtains were opened to illuminate the lecture hall.



Figure 2. Students do not turn on the lights during the day, but take advantage of the light from outside.

2. Air Conditioning System

Student behavior in the use of electrical energy in the air conditioning system in the form of using fans and air conditioners as described by the informant. They have their own way of using electrical energy in fans and air conditioners. Lat explained that fans and air conditioners are set using a timer sensor as a delay in use. Optical sensors can also be used to calculate the need for air production in existing AC systems. "So if the number of people increases, the air conditioner will automatically produce cold air according to the cold air needs. This means that the AC can be a detector for him." he said.

The student's behavior shows a caring attitude towards saving electrical energy. AC is an electrical device that has great saving potential. This is proven by Santoso & Salim (2019) which states that the simulation calculation of household savings of 30% of the total household electricity consumption is from air conditioning and refrigerators. Studies Biantoro & Permana (2017) explained that in Tangerang Regency, the AB building is included in the category of very efficient in consuming energy. One reason is that most rooms use natural ventilation.

One of the informants explained that the air conditioner in the library was turned on using a low temperature (Hes). In addition, a student admitted that he turned off the fan and air conditioner after using it without relying on officers (Ikh). The student's behavior reflects a caring attitude as an effort to save electrical energy. As explained by Mulyadi et al. (2013) that the efficiency effort in the air conditioning system is by turning off the air conditioner when the room is not in use. In addition, by adjusting the temperature sufficiently, it means not turning on the AC too cold. Fitriani & Astuti (2016) explained that the use of Central AC with a temperature of 24oC-25oC is an effort to conserve air energy.



Figure 3. Students set the air conditioner to a sufficient temperature.

Some students show unique behavior. Among them And explained "I tried to open the upper window closest to the hallway. I do this to get additional air so that the air circulation goes well." While Sai's expression "I was forced to use a book to be a fan". While Afq added, "I saw some students bringing and turning on an electronic fan with the aid of a battery".

These behaviors show concern for reducing the use of electrical energy. Air ventilation through vents or windows is a natural air circulation system, so it does not require electrical energy. Sufficient air change rate is 0.63 m/min per person (Fitriani & Astuti, 2016). The unique efforts of students by using books and electronic fans are efforts to save electrical energy. As described by Cahyani (2018) that adequate ventilation can reduce dependence on the use of air conditioning. In addition, the study conducted by Sugiarto & Gabriella (2020) shows that the highest answer in the behavior of energy conservation efforts is to use natural air ventilation for circulation rather than turning on the air conditioner.

3. Support Equipment System

The information given by students during interviews regarding the behavior of the support equipment system varied greatly. Some of them said they rarely bring a lap top on campus for various reasons. Among them, laptops are not always needed in class, there are no assignments that require using them, and they are complicated and heavy when carrying them because of their large size. I didn't bring my lap top (Ruq, Mag, Hi, Fat, Mut, Sai, Mei, Lat, Aru). Students who brought laptops for paper presentation assignments, for example, said that the battery was fully charged from home (Hes, Ash, & Afq). In addition, there are informants who always carry a laptop because it is small and simple. But he opens only when needed (Ikh, Ain, & Kho). The same phrase from Giw "I go to campus every time I bring my lap top in class, but I will only use it when it is necessary." "I use a laptop on campus and use electrical energy if my battery is depleted, and immediately unplug the cable from the power source when it is full" (Dia).

The student's behavior reflects a caring attitude towards saving electrical energy. Charging the battery from home shows an effort not to rely on the use of electrical energy from campus. Also use a laptop or charge the battery as needed. This example is an attempt to avoid waste. This is classified as an individual who obeys the government's recommendations as stated in the Presidential Instruction of the Republic of Indonesia. This behavior can be said by Saegert as environmentally friendly behavior, which is an effort to maintain the surrounding environment or natural resources by reducing electrical energy consumption (Sugiarto & Gabriella, 2020). Other supporting equipment used by students is handphone (HP). Some of them use their cellphones with internet networks only when needed. Cell phones are used to communicate and interact with lecturers, students, and others. In addition, cellphones are also used as learning media in the classroom and outside the classroom (Riz & Yaz). This behavior shows concern for saving electrical energy as an effort to implement energy dharma chess. Energy conservation has the most dominant influence on the consumer side as a control over the use of electrical equipment and energy (Saputra et al., 2019).

The results of observations made on campus I, it is known that students use switches to charge laptops and cellphones. The switch is available in the room next to the library building. Students who use the facility in the form of a switch stated that they always check the condition of the cellphone battery, when it is full, immediately unplug the charger from the power source (Sai, Ikh). Then Ikh said "I don't operate my cellphone when it's charging, I even set airplane mode so that the battery is fully charged immediately". It's different with Ain who brings a power bank to college just in case the cellphone needs battery power.



Figure 4. Students use switches on campus to charge laptops and cellphones.

All of the above behaviors reflect concern for energy efficiency because saving energy is the same as helping to reduce the country's energy supply. Saving energy is a green behavior. This means that students try to participate in supporting the place of study to become a green campus.

In addition to the equipment mentioned above, sometimes Liquid Crystal Display (LCD) is used by students for academic and student activities. That is, it is sometimes used during lecture activities with lecturers and students themselves. Some students honestly admit that LCDs are rarely used unless there is an order from the lecturer to operate them (Ruq, Giw, Kho, & Riz).

The variety of student behavior illustrates a caring attitude. Care about energy savings by using facilities only when needed and turning off electronic devices when not in use. Santoso & Salim (2019) describes that there are several efforts to save electrical energy, one of which is the limitation of usage time.

Riz explained "I sometimes use the facilities provided by the campus in the form of computers but it happens that it has been damaged for a while, so I don't use them". Meanwhile, Yaz said, "I sometimes use the computer in the Head of Study Program for the benefit of the Department of Student Association (HMJ)".

This behavior indicates that the use of campus facilities is utilized as needed. In this case, students participate in campus energy saving efforts. The next supporting tool used by students is the sound system. Informants use it for the activities of the Student Activity Unit (UKK). In this case, he explained that he always keeps it safe and functions as needed (Riz). This student reflects a caring attitude with energy. If energy is used properly, conservation efforts can be carried out well in the campus environment.

The form of student concern for the use of electrical energy at IAIN Salatiga is briefly described in Table 1.

Table 1. Student Behavior towards the Use of ElectricalEnergy

Component	Care
Lighting	Turn on the lights when the room gets dark
	Turn on one parallel switch button
	Turning off the lights in some places
	Turning off the lights after being
	reprimanded by others
	Turning off the light after getting a sample
	Open the curtains & windows to light up the
	room
Air	Adjusting AC with timer & optical sensor
	Turn on the air conditioner at low
	temperature
	Turn off fans and air conditioners after use
	Open the window to get some air from outside
	Turning books into air producers
	Carrying and turning on the mini electronic
	fan
Ancillary equipment	Use laptops, cellphones, LCDs, and sound systems only when needed
	Bring a laptop with a full battery
	Immediately unplug the charger when the
	battery is fully charged
	Set airplane mode when HP is charging
	Bring a fully charged power bank from home
	Turning off the LCD after using it

The concern of students intentionally or unintentionally is very important for the campus environment. As part of the academic community, students participate in the development of their place of study. Development does not just mean building a building but building environmental conditions. A safe, comfortable, beautiful and beautiful environment can be obtained if the surrounding residents contribute to the implementation process. One application is to save electrical energy. In this day and age, almost everyone needs electrical energy. Electrical energy available on campus should be maintained. Maintain by behaving sparingly in its use. Saputra et al. (2019) mentions that there are several factors that affect the conservation of electrical energy on the consumer side. These include behavior in actions and tools, understanding behavior, and policies/commitments.

Several students who became informants in this study have shown energy-saving behavior. Energy efficiency on campus can lead to the creation of a sustainable campus. This means that the stored energy can be used for the future. A number of findings involving students as the central subject in this study ultimately answered the framework of thinking as shown in Figure 5.

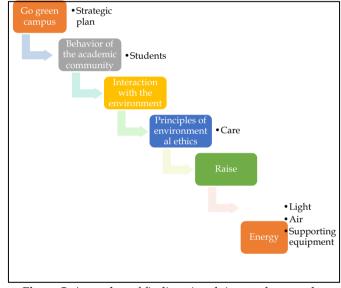


Figure 5. A number of findings involving students as the central subject

Conclusion

The behavior of IAIN Salatiga students in the use of electrical energy in the lighting system, air conditioning, and supporting equipment is categorized as having concern. These behaviors were identified during academic and student activities. The caring behavior carried out by the informant is shown in attitudes and actions. The informants showed a caring attitude towards energy saving efforts, disagreed with the neglect of the wasteful use of electrical energy, and gave birth to initiatives as alternative solutions, both natural and unique, intentional or not.

Acknowledgements

This research was completed thanks to the involvement of various parties. Therefore, thanks are conveyed to the 1684 students and lecturers of IAIN Salatiga who gave the research permission. Thanks also to the staff and all informants who played a role in data collection. Jazakumullahu ahsanal jaza'. Amen.

References

- Abd Razak, M. Z., Abdullah, N. A. G., Nor, M. F. I. M., Usman, I. M. S., & Che-Ani, A. I. (2011). Toward a sustainable campus: comparison of the physical development planning of research university campuses in Malaysia. *Journal of Sustainable Development*, 4(4), 210. http://dx.doi.org/10.5539/jsd.v4n4p210
- Abdurrahman., Nugroho, M. A., Palamban, H., Mukharis, Sutinah, Ma'ruf, H., ... Samin. (2011). *Alquran dan Isu-isu Kontemporer*. Yogyakarta: Sukses Offset.
- Alshuwaikhat, H. M., & Abubakar, I. (2008). An integrated approach to achieving campus sustainability: assessment of the current campus environmental management practices. *Journal of Cleaner Production*, *16*(16), 1777–1785. https://doi.org/10.1016/j.jclepro.2007.12.002
- Asmani, J. M. (2012). Internalisasi Pendidikan Karakter di Sekolah. Yogyakarta: Diva Press.
- Biantoro, A. W., & Permana, D. S. (2017). Analisis Audit Energi Untuk Pencapaian Efisiensi Energi Di Gedung Ab, Kabupaten Tangerang, Banten. *Jurnal Teknik Mesin Mercu Buana*, 6(2), 85–93. http://dx.doi.org/10.22441/jtm.v6i2.1186
- Cahyani, O. I. (2018). Penerapan Konsep Green Architecture Pada Bangunan Perpustakaan Universitas Indonesia. *Jurnal Ilmiah Desain & Konstruksi*, 17(2), 76–85. http://dx.doi.org/10.35760/dk.2018.v17i2.1946
- Dahle, M., & Neumayer, E. (2001). Overcoming barriers to campus greening: A survey among higher educational institutions in London, UK. *International Journal of Sustainability in Higher Education*. 2(2). 139-160. https://doi.org/10.1108/14676370110388363
- Erawati, M. (2011). *Madrasah dan Pelestarian Lingkungan: Sumbangan Konseptual dan Strategi Aksi* (Hammam, ed.). Salatiga: STAIN Salatiga Press.
- Ervianto, W. I. (2012). Selamatkan Bumi Melalui Konstruksi Hijau. In Perencanaan, Pengadaan, Konstruksi & Operasi, Yogyakarta. Yogyakarta: Andi.
- Fitriani, D., & Astuti, S. (2016). Penerapan Green Office pada Kementrian Kesehatan Republik Indonesia. *Jurnal Utilitas*, 2(1), 64–71. https://doi.org/10.22236/utilitas.v2i1.4560
- Fox, W. (2012). *Ethics and the built environment*. New York: Routledge.
- Ghani, F. (2012). Issues in Sustainable Architecture and Possible Solutions. *International Journal of Civil &*

Environmental Engineering IJCEE-IJENS, 12(1), 21–24.

- Gobinath, R., Rajeshkumar, K., & Mahendran, N. (2010). Environmental performance studies on educational institutions. *International Journal of Environmental Sciences*, 1(1), 18–29. Retrieved from https://www.indianjournals.com/ijor.aspx?target =ijor:ijes&volume=1&issue=1&article=002
- Hoff, M. (2012). Sustainable community development: Studies in economic, environmental, and cultural revitalization. New York: Lewis Publishers.
- Kartasapoetra, K. (2014). *Kamus Sosiologi dan Kependudukan*. Jakarta: Bumi Aksara.
- Luthfi, A. M. (2017). Model Pembangunan Qaryah Thayyibah: Suatu Pendekatan Pemerataan Pembangunan. Jakarta: Intermasa.
- Maslikhah. (2013). Alam Terkembang Menjadi Guru: Memotret Fenomena Lingkungan melalui Pendidikan Lingkungan Hidup. Salatiga: STAIN Salatiga Press.
- Maslikhah. (2015). Nalar Akademik 7 Pilar Eco Campus untuk Pembangunan Berkelanjutan. Salatiga: LP2M Press.
- Mufid, S. A. (2010). Ekologi Manusia dalam perspektif sektor kehidupan dan ajaran Islam. Bandung: Remaja Rosdakarya.
- Mulyadi, Y., Rizki, A., & Sumarto, S. (2013). Analisis Audit Energi untuk Pencapaian Efisiensi Penggunaan Energi di Gedung JICA FPMIPA Universitas Pendidikan Indonesia. *Electrans*, 12(1), 81–88. Retrieved from https://ejournal.upi.edu/index.php/electrans/art icle/view/1870
- Otto, E., & Wohlpart, A. J. (2009). Creating a culture of sustainability: Infusing sustainability into the humanities. *Journal of Education for Sustainable Development*, 3(2), 231–235. https://doi.org/10.1177/097340820900300223
- Pandey, N., & Vedak, V. (2010). Structural transformation of education for sustainable development. *International Journal of Environment* and Sustainable Development, 9(1-3), 3-15. http://dx.doi.org/10.1504/IJESD.2010.030063
- Panwar, N. L., Kaushik, S. C., & Kothari, S. (2011). Role of renewable energy sources in environmental protection: A review. *Renewable and Sustainable Energy Reviews*, 15(3), 1513–1524. http://dx.doi.org/10.1016/j.rser.2010.11.037
- Park, J., & Ha, S. (2012). Understanding proenvironmental behavior: A comparison of sustainable consumers and apathetic consumers. *International Journal of Retail & Distribution Management.* 40(5). http://dx.doi.org/10.1108/09590551211222367
- Posner, S. M., & Stuart, R. (2013). Understanding and advancing campus sustainability using a systems framework. *International Journal of Sustainability in*

Higher Education, 14(3), 264-277. https://doi.org/10.1108/IJSHE-08-2011-0055.

- Putra, P. P., (2019). Perilaku Pro LIngkungan Pengurus Organisasi Mahasiswa Pecinta Alam. *Cognicia*, 7 (3), 378-389.
 - https://doi.org/10.22219/cognicia.v7i3.9264
- Ridwan. (2011). *Etika Lingkungan dalam Kajian Perilaku*. Yogyakarta: Tiara Wacana.
- Rohadi, T. (2011). Budaya lingkungan: Akar masalah dan solusi krisis lingkungan. Yogyakarta: Tiara Wacana.
- Santoso, A. D., & Salim, M. A. (2019). Penghematan Rumah Tangga dalam Menunjang Listrik Kestabilan Energi Nasional dan Kelestarian Lingkungan Household Electricity Savings to Support National Energy Stability and Environmental Sustainability. Jurnal Teknologi Lingkungan, 20(2), 263-270. https://doi.org/10.29122/jtl.v20i2.3242
- Saputra, A. N., Manuaba, I. B. G., & Hartati, R. S. (2019). Upaya Konservasi Energi Listrik Pada Kawasan Pusat Pemerintahan Kabupaten Badung Mangunpraja Mandala. *Majalah Ilmiah Teknologi Elektro*. 18(1). 41–46- Retrieved from https://ojs.unud.ac.id/index.php/JTE/article/vie w/42936
- Sudarsono. (2017). Realitas Mengendalikan Dampak Pemanasan Global dengan Kearifan Lingkungan. Yogyakarta: Pusat Pengelolaan Lingkungan Hidup Regional Jawa Kementerian Negara Lingkungan Hidup RI.
- Sudirman, S. (2011). *Pilar-pilar Islam: Menuju kesempurnaan sumber daya muslim*. Malang: UIN-Maliki Press.
- Sugiarto, A., & Gabriella, D. A. (2020). Kesadaran dan Perilaku Ramah Lingkungan Mahasiswa di Kampus. Jurnal Ilmu Sosial Dan Humaniora, 9(2), 260–275. https://doi.org/10.23887/jishundiksha.v9i2.21061
- Team, S. O. S. (2013). *Pemanasan Global-Solusi dan Peluang Bisnis*. Jakarta: Gramedia Pustaka Utama.
- Utami, U. (2014). Konservasi sumber daya alam: perspektif Islam dan sains. Malang: UIN-Maliki Press