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Safety precautions in the usage of extension cords by students in halls and hostels

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ABSTRACT

This paper presents the evaluation of the safety measures adopted by Ho Technical University (HTU) students in the use of power extension cords in their halls and hostels, along with their safety considerations for properly selecting these cords to avert fire outbreaks or prevent them from becoming a potential fire hazard. Whenever extension cords are utilized inappropriately it can lead to fire or electric shock perils. The assessment of the awareness level of safety practices is yet to be rigorously pursued as an agenda towards extension cord usage in institutions and agencies perceived to be high energy consumers where fire outbreaks occur frequently. A quantitative research approach was adopted, using a questionnaire for data collection. The findings revealed that about 52% of the respondents did not know the current and power ratings and the effects of overloading the extension cord. It was recommended that consumers purchase extension cords that have been endorsed by an autonomous testing laboratory, whereas the university should immediately organize a seminar to educate the staff and students about the use of the extension cord.

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1. INTRODUCTION

Electrical extension cords are the same old thing that has been used as comfort since mid-1940. Extension cords are a simple and practical way to connect power from main socket outlets to appliances in the built environment [1]. However, its improper application could present serious fire hazards to the occupants and their properties. According to occupational environmental health and safety (OEHS) in 2004, misused and damaged extension cords have led to painful injuries, fires, equipment damage, regulatory violations, and penalties [2].

According to Rabban *et al.* [3] extension cords caused 4600 residential home fires, resulting in 70 deaths, 230 injuries, and $42 million in damage. Extension cords also caused 2200 non-fatal electrocutions in patients of all ages in non-fire-related events. There were 28,160 home fire occurrences in British Columbia between 2004 and 2017, with 2,635 (9.40%) being electrical fires, including extension cord-related fires. These electrical fires resulted in 150 casualties (deaths and injuries combined) and a little over $150 million in damages [4].

The most common causes of fire arising from the misuse of extension cords include overloading, passing the cords under carpets, rugs and doorways, and lack of proper care and maintenance. Overloading can happen when a few apparatuses or gadgets are connected to one extension cord or when lines are "daisy-chained" that is stopping various electrical lines together [2]. In other instances, overloading occurs when an appliance of a higher wattage is used to draw power from an extension cord with a lower rating [4], [5]. In reality, most household extension cords are only rated for a maximum of 10 amps or 1200 watts. When cords are passed under carpets, rugs and doorways with people walking on them the wires inside the cords begin to break down, which invariably reduces the cord's ability to transmit current effectively, causing it to get hot [2], [6]. The resultant effect is an outbreak of fire.

Almost every day brings word of a fire breaking out in some sections of Ghana, sparking dread and panic among the populace [7] due to the lack of knowledge and information about the basic use of electricity. Recently, the fire outbreak statistics from the Ghana national fire service (GNFS) for the year 2009 disclosed that, total fire outbreaks with some contribution to these fire outbreaks emanating from overloading appliances, which causes them to become overheated, which then causes an electrical house fire. According to Adekunle *et al.* [8], a fire started by a frayed extension cord severely damaged a residence in Ikorodu in November 2013. Firefighters discovered the fire was started by an extension cord that had become tangled beneath the edge of a seat. The agents confirmed that the house had become a total disaster.

Extension cords, additionally alluded to as portable cords, are utilized for transitory power associations requiring an adaptable cord. They are not planned to be utilized as a substitute for the fixed wiring of a structure, but they may, under certain conditions, be utilized as an impermanent wiring arrangement. The national electric code (NEC) article 400 addresses the extension cord as a different class. They don't believe it to be a wiring strategy [9]. Extension cords offer expedient methods of bringing temporary power to a device or equipment, and they have been in use since the mid-1940s. The NEC, national fire protection association (NFPA) 70E, and occupational safety and health administration (OSHA) all require the utilization of a ground fault circuit interrupter (GFCI) at whatever point extension cords are associated with a transitory power source, for example, a brief post-administration, generator, or when associated with the changeless wiring of a structure [10]. A GFCI can help forestall electric shock. On the off chance that an individual's body begins to get a stun, the GFCI senses this and cuts off the force before he/she can be harmed. GFCIs are for the most part introduced where electrical circuits may incidentally come into contact with water [11], [12]. They are frequently found in kitchens, showers and pantries, even extension cords where electric force apparatuses may be utilized. As per the National Electrical Code, a "ground fault" is a directing association (regardless of whether deliberate or coincidental) between any electric conveyor and any leading material that is grounded or that may become grounded [13].

Extension cords can overheat and cause fires when utilized inappropriately. Overheating is typically brought about by overburdening or interfacing gadgets that expend more force (watts) than the cord can deal with. Damaged extension cords can likewise cause fires. Extension cord should just be utilized temporarily and, if done unsafely, pose a safety threat [14], [15]. However, safety awareness is yet to be assessed as an agenda for extension cord usage in institutions and residential homes that are high energy consumers and prone to fires. Thus, this paper evaluates students' safety practises and policies when using extension cords in residence halls and dormitories, as well as their safety considerations for appropriately selecting extension cords based on the application to prevent fire outbreaks or fire hazards, and suggest recommendations to raise awareness of the danger when improperly used.

2. RESEARCH METHOD

The primary aim of this study was to evaluate the safety measures adopted by students in the use of extension cords in their halls and hostels, along with the safety considerations for properly selecting extension cords depending on the application to prevent them from becoming a potential fire hazard. The study adopted a quantitative research approach; using a questionnaire because they offer a considerable and objective view of issues. The design used allowed the investigators to collect empirical data to answer the research questions or test the objective of the study.

The target population for the research work was Ho Technical University students in selected halls and hostels of residence within and around the University environs who have stayed in these halls and hostels for over six / 6 months as of the period of the survey. Respondents were selected via a random sampling method in administering the questionnaires. This suitable technique was employed to ensure that students from single-sexed halls/hostels and mixed-sex halls/hostels were fairly represented and included in the study to avoid the bias often associated with other sampling techniques. By adopting a purposive sampling method, three / 3 halls and two / 2 hostels of residence were selected: Vodzi Hall (male only), Acolatse Hall (female only), Adaklu Hall (mixed hall), Nogora Hostel (mixed hostel), and Cambridge Hostel (mixed hostel).

After obtaining permission from the hostel owners and administrators, the rooms of these students were visited, and any available and willing students were invited to participate in the study. Four hundred / 400 respondents participated in this research survey. The respondents answered the questions based on a five-point Likert scale rating, with five / 5 being the highest of the rating and interpreted as 1 = strongly disagree; extremely low, 2 = disagree; low, 3 = uncertain; average, 4 = agree; high, and 5 = strongly agree; extremely high. The various responses from the questionnaire were checked for errors, inaccuracies and inconsistencies. Following this step, questionnaires were given identification numbers and responses were coded to use the statistical package for social sciences (SPSS) version 16 to process the collected data. Simple frequency, percentages and descriptive statistics were used as analytical tools.

The questionnaire's validity and reliability were further investigated [16]. The degree to which a question assesses the aspect that it is intended to test is referred to as validity. Only if the questionnaire is statistically trustworthy and valid will it be relevant for different researchers and studies. The capacity of a question to consistently give the same response is referred to as reliability. Cronbach's alpha can be used to measure reliability in SPSS. The alpha value of 0.70 is frequently used as a criterion for determining dependability [17]. Cronch's alpha was discovered to be 0.853 for this research, which is higher than the and indicates an excellent assessment of the reliability and consistency of the test items.

3. RESULTS AND DISCUSSION

The study sought to investigate safety precautions and fire outbreaks in the usage of extension cords by HTU students in selected halls and hostels at Ho Technical University. In doing so, the questionnaire was administered to the students to be answered. Sections of the questionnaire, which include bio-data, general knowledge of extension cords, selection, usage and maintenance of extension cords, fire outbreak risk and safety knowledge in the use of extension cords, were answered by the students, and their results are presented.

3.1. Biographic data of respondents

At the end of the survey over a three / 3-week period from 10th February to 2nd March 2020, 400 questionnaires distributed to sample students in the selected halls and hostels of residence were retrieved. The total number of respondents who provided clear answers to the questionnaire was 374 (representing 93.50%) out of the 400 questionnaires administered. The 26 respondents out of the 400 (representing 6.50%) provided errors, incomplete and inconsistent information, which were excluded from the inputs used for analysis. In all, the males were 280 (representing 74.90%), while the females were 94 (representing 25.10%). This may be attributed to the fact that males usually use more extension cords generally than females.

In the age distribution sample given, a majority (72.10%) of the respondents were aged 15–25 years, followed by those aged 26–45 years (24.90%). Those aged 45 and older were in the minority and constituted (2.90%) of the sample respectively. Students from all faculties in the university were involved in the research. Students in year 1 were 123 (32.90%), year 2 were 161 (43%), year 3 were 81 (21.70%) and final year 4 students, mostly top-up students were only 9 representing (2.40%).

3.2. General information

Respondents were asked about some general knowledge about ever using an extension cord, the amperage and the wattage rating of the unit. The majority, representing 99.70% had used an extension cord before whereas a minority of 0.30% of these respondents had never used the cord before. For the knowledge of amperage and wattage ratings of the extension cord, a majority of 193 respondents (representing 51.60%) do not know the amperage and wattage ratings of these cords, while 179 (representing 47.90%) are knowledgeable of these ratings. Three (3) respondents (0.50%) couldn't answer this question, and this suggests that the respondent did not understand the question due to its technicality.

Interestingly, over 50% of the respondents do not know extension cord amperage and wattage ratings. This represents a great danger to the user. The user might be tempted to plug in as many electrical loads as possible on this unit, thereby causing overloading of the extension cord, which in turn causes an increase in the wires' temperature, which can lead to melting, decomposition, or burns. Sankaranarayanan and Wan [18], overloaded appliances and misuse of extension cords can cause abnormal electrical conditions and start a fire.

3.3. To what extent do you do the following before the usage of an extension cord (selection)

Questions in Table 1 were used to test the knowledge level of the respondents, and to find out what they do before using the extension cords after acquiring them. A five point Likert-scale was utilized to determine the safety options before the selection of an extension cord by the respondents where 1 signified strongly disagree and 5 represented strongly agree. The results are presented in Table 1.

As can be gleaned from Table 1, the importance of each of the independent variables predicting respondents' attitudes towards extension cord usage as they acquire them for the first time is assessed

through the descriptive statistics method. The means appeared slightly high. Clearly, the most preferred attitude is "I choose cords with three-prong plugs (M = 3.82)" and this might be attributed to the easy entry of the three-prong plugs into a receptacle. One of the advantages of choosing a three-prong plug is that it helps guard against electric shock, provided the earthing framework is effective. A slight majority of the respondents strongly agree with "I consider the length I will need to draw power from before buying the cord" with a mean of (M = 3.73) followed by "I inspect the extension cord for any damage before buying (M = 3.66)". The respondent was thinking that having a long cord is the best, forgetting that the length of the extension cord is another significant thought. Since voltage is lost across separation, shorter lines are best for running gadgets with higher current needs. Utilizing a shorter cord is generally fine for most appliances, as subbing a more extended cord for a gadget with a higher current could harm your appliance or represent a security danger. If all other fails, go with the shortest cord.

Table 1. Attitudes towards extension cord before use

Before use	Mean	Std. deviation
I choose cords with three-prong plugs.	3.82	1.234
I consider the length I will need to draw power from before buying the cord.	3.73	1.308
I inspect the extension cord for any damage before buying.	3.66	1.331
I inspect my extension cord for physical damage before use.	3.61	1.286
I am aware that there are extension cords for indoor use.	3.25	1.408
I am aware that there are extension cords for outdoor use.	3.14	1.369
I read the information about the amount of power the extension cords can provide.	3.05	1.511
I check to see if the extension cord has been approved for use by a nationally recognized testing laboratory.	2.94	1.302

Mean (1 = strongly disagree; 2 = disagree; 3 = uncertain; 4 = agree; 5 = strongly agree)
Source: field data (2021)

Much emphasis was not laid on the awareness of the usage of extension cords both indoors and outdoors. Both accumulated a mean of (M = 3.25) and (M = 3.14) respectively. This means any extension cord which can support the respondent in getting their system working, irrespective of the implications on the type of extension cord and where to be used does not matter, forgetting that using an indoor extension cord for outdoor or vice versa can be very dangerous due to overheating that may arise and cause a fire. It was very interesting to note that the respondents scored the very important factors "I read the information about the amount of power the extension cords can provide" and "I check to see if the extension cord has been approved for use by a nationally recognized testing laboratory" with the lowest means of (M = 3.05) and (M = 2.94) respectively. Research conducted by the researchers revealed that most of the extension cords in the country had no standard label on them from the approved authority that regulates the influx of goods into the country; therefore, consumers tend to forget these two important points when acquiring the extension cord.

In Ghana, the Ghana standards authority (GSA), formerly the Ghana standards board (GSB), is a Government of Ghana agency accountable for the maintenance of suitable standards for products and services and sound management practices in industries and public institutions [19]. One of their key responsibilities is to promote standards in public health, safety and welfare for consumers of various goods and services produced in Ghana and imported, whether for local consumption or export are safe, reliable and are of good quality, and meet the standards of the international standards organization (ISO). Most of these cords have low standard material, poor cable size and insulation. It should be noted that extension cords experience heat in their wires when electrical current transmits through them. When more power than the capacity of the cord passes through the wires, it overheats and melts the insulation, causing short circuits and fire outbreaks [11].

The use of uncertified extension cords is a breach of both OSHA and National Fire Protection Association codes. The OSHA Code of Federal Regulations (29CFR1910.303 (a)) states that conductors and hardware are worthy of use just on the off chance that they are endorsed by recognized research centres. Endorsed electrical extension cords are justifiable in the working environment as impermanent wiring and for not more than 90 days. Be careful with modest gadgets, they regularly don't fulfil security guidelines and are unlawfully marked [20].

3.4. To what extent do you do the following during the usage of an extension cord (usage)

Questions in Table 2 illustrate the attitude towards the extension cord after use. The consideration required to securely utilize an extension cord includes directing cords away from areas where they are likely to be harmed and utilizing the shortest cord that will fill each proposed need. A five point Likert-scale was utilized to determine the safety options during the use of an extension cord by the respondents, where 1 signified strongly disagree and 5 represented strongly agree.

As depicted in Table 2, the majority of low mean values were recorded for the precautionary measures taken during the use of extension cords. The critically dangerous preference "I plug multiple appliances on my extension cord" scored the highest mean (M = 3.56), meaning most of the respondents agree or strongly agree with doing so. Because over 51.6% of the respondents do not know the current and power ratings of extension cords as indicated, they do not know the effect of overloading the extension cord. Overburdening electrical cords or circuits can cause an electrical fire because of the extra electrical flow going through the outlet, which is more than what it was intended to deal with. At the point when this occurs, the wiring or the outlet will overheat and possibly cause an electrical fire. On the other hand, "I continue to use the extension cord even if it feels hot when I touch it" with a mean of (M = 2.43) was slightly lower even though it is dangerous. It is very important to inspect the cord intermittently for signs of harm or indications of over-burdening, melting deformation, obscuring of colour, or a burnt or electrical smell caused by overheating of these cords.

Table 2. Attitudes towards extension cord during use (usage)

Maintenance Preference	Mean	Std. deviation
I plug multiple appliances into my extension cord.	3.56	1.296
I use an extension cord marked for indoor use for indoors and outdoor use for outdoors.	3.03	1.354
I pass extension cords under carpets and furniture.	2.71	1.462
I continue to use the extension cord even if it feels hot when I touch it.	2.43	1.327
I attach extension cords to the walls and floors using nails and straps.	2.30	1.344
I use the extension cord when it is wet.	2.11	1.344

Mean (1 = strongly disagree; 2 = disagree; 3 = uncertain; 4 = agree; 5 = strongly agree)
Source: field data (2021)

Table 2 reveals that the vast majority of respondents hold opinions that either disagree or strongly disagree with the rest of the preferences listed in the table due to the low mean values associated with each preference. According to the low mean scores that were recorded for each preference, the respondents have only a moderate understanding of the safety precautions that should be observed when making use of extension cords. It's not common to use an extension cable to plug in a lot of things at once. Most of the time, the equivalent load is greater than what the extension cord can handle. As a result, the cable might get too hot and break from that.

3.5. To what extent do you do the following after the usage of an extension cord (maintenance)

Regarding the assessment as shown in Table 3, the mean values scored by the respondents were approximately high, indicating that they have a slight idea of the "dos" of extension cord usage. The highest mean value, "I keep extension cords dry and free from water" (M = 3.93) was much of a preference to the respondents because exposing the extension cord to water can surely cause electrocution or lead to a fire outbreak [21]. The rest of the mean values for each factor were rated very high due to the understanding of the effects and dangers that might occur due to poor adherence to safety measures when using extension cords.

Table 3. Attitudes towards extension cord after use (maintenance)

Maintenance	Mean	Std. deviation
I keep extension cords dry and free from water.	3.93	1.334
I keep extension cords away from children and animals.	3.76	1.359
I store extension cords indoors after use.	3.69	1.334
I regularly check and inspect my extension cord to see if it is in good working order.	3.67	1.335
I throw away any cord which is damaged.	3.60	1.356
I unplug extension cords when they are not in use.	3.53	1.383

Mean (1 = strongly disagree; 2 = disagree; 3 = uncertain; 4 = agree; 5 = strongly agree)
Source: field data (2021)

3.6. To what extent do you rate the following as the causalities of a possible fire outbreak (fire outbreak risk)

The descriptive statistics reveal that a majority of the respondents rated this question "I am convinced that based on my maintenance culture I am exposed to fire outbreak in the use of the extension cord" extremely low, with the highest frequency of 112 (representing 29.90%), followed by average with a frequency of 84 (22.50%), whereas a frequency of 74, representing 19.80%, was rated low. Both high and extremely high had frequencies of 56 and 48 (representing 15% and 12.80%) respectively. From the

frequencies obtained from this question, most of the respondents think that, based on their maintenance practices with the use of their extension cords, they are not exposed to the casualties of a possible fire outbreak. This might be true based on the facts obtained in Table 3 which they rated very high means for maintenance practices with the use of extension cords, forgetting that the risk of shocks and fire outbreaks from the usage of extension cords does not depend solely on proper maintenance.

Again, the respondents were asked, "I am convinced that based on how I use the extension cord, I am exposed to a fire outbreak." Here again, the respondents scored both low and average with frequencies of 101 and 83, (representing 27% and 22.20%) respectively. Extremely low had a frequency of 82 (21.90%) whereas high and extremely high had the lowest rates of 15.80% and 13.10% respectively. In Table 2, respondents were asked to answer questions related to safety measures taken during the use of extension cords. It was concluded from the Table 2 analysis that the respondents barely took precautions when using these cords. Contrasting the two clearly shows that the respondents do not know that based on their low level of precautionary measures taken, they are exposed to fire and electric stun, but they are not yet convinced that they are exposed to these hazards under this research question.

Another question, "I am convinced that based on my initial information on the extension cord before buying, I am exposed to a fire outbreak" was asked. The respondents scored an extremely low 26.20% followed by an average of 24.10%. The parameter low scored 23.80% while high and extremely high scored 17.60% and 8.30% respectively. Amazingly, most respondents strongly disagree with this question because, as can be gleaned from Table 1, the most important information required to know before getting an extension cord was rated low. The respondents chose convenience over safety when getting an extension cord. This has been reflected under this question with the scores given. Extension cords pose a serious fire risk when used without restriction. When multiple appliances, including a TV, home theatre system, computer, and others, are hooked into a single extension cord, it places an enormous power burden on a single socket that might not be able to handle it and this may result in overheating and starting a fire [22].

Finally, the question "overall, how would you rate your exposure to the risk of a fire outbreak in the use of the extension cord?" was asked. A five-point Likert- scale was utilized to determine the exposure to the risk of fire outbreak in the use of the extension cord, where 1 signified extremely low and 5 represented extremely high. The results are shown in Table 4.

Table 4. Exposure to the risk of fire outbreak

Code	Preference	Frequency
1.	Extremely low	60
2.	Low	52
3.	Average	105
4.	High	84
5.	Extremely high	73

Mean (1 = extremely low; 2 = low; 3 = average; 4 = high; 5 = extremely high)
Source: field data (2021)

Using the Likert scale analysis as a statistical tool, let;
H_0 = the exposure to the risk of fire outbreak in the use of the extension cord is low
H_1= the exposure to the risk of fire outbreak in the use of the extension cord is high
Coding in SPSS; 1 = extremely low; 2 = low; 3 = average; 4 = high; 5 = extremely high
Critical region = 3.0; accept the null hypothesis if the mean response is less than 3.0 and reject if it is greater than 3.0.

$$Mean\ Response\ (M.R) = \frac{(5\times73)+(4\times84)+(3\times105)+(2\times52)+(1\times60)}{374} = 3.16$$

Since the mean response calculated is greater than the critical region value of 3.0, it implies that the null hypothesis can be rejected with the conclusion that the respondents are on average exposed to the risk of a fire outbreak in the use of their extension cord as rated. Sadly, based on the scores provided, the respondents have very little knowledge about the use of the extension cord. From the information given throughout this research, it is obvious that most of them lack the technical knowledge to understand these cords and what makes them potentially hazardous. They mostly rely on convenience rather than safety, thereby exposing themselves to dangers associated with the use of the wrong extension cords, and upon their little knowledge, still feel that their exposure to the risk of fire outbreaks in the use of extension cords is relatively low. Approximately 3,300 home fires start in extension cords every year, killing 50 individuals and harming 270 more. An electrical cord can overheat and cause fires when utilized inappropriately, so remember these significant hints to ensure your home and working environment [23].

3.7. To what extent do you agree with the following as the safety measures to prevent fire outbreaks from extension cords? (safety)

The final question on the questionnaire was, "overall, I am convinced that based on how I use the extension cord, the safety of my household is at risk." The overall analysis was determined by a five-point Likert-scale, where 1 signified strongly disagree and 5 represented strongly agree. The respondents answered accordingly, as illustrated in Figure 1.

The final analysis of the questionnaire is displayed in Figure 1. The respondents finally agree to this question that, based on their way of using these cords domestically, they are at risk, with a 23% score. Also, 22% strongly agree, while 20% strongly disagree. Lastly, 18% disagreed, and 17% were uncertain about this question. It can, therefore, be concluded that most respondents agree on the risk they are involved in at their abode with the way they use their extension cord.

It is evident throughout the survey that most respondents do not have very practical knowledge of the use of the extension cord based on the data given. Mostly, they rely on convenience rather than safety when getting this unit. The questionnaire administered to them exposed them to the technicalities involved in the use of extension cords. These technical questions exposed their low-level thinking and understanding in their submissions. The only high-level skill they had was the maintenance of their extension cord, which scored high mean values throughout the questionnaire administered because they permanently use these cords and are looking forward to a lasting use, so good maintenance will do.

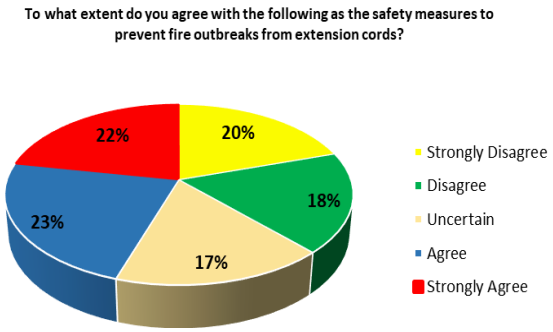

Figure 1. Exposure to safety measures to prevent fire outbreaks

More education is required to expose these technicalities to consumers and educate them on how to use these cords, starting from the standard label, the required authority to be provided on tested ones, and the required current and wattage ratings to be provided by the manufacturer. Therefore, a seminar would be held by the engineering faculty of the university to educate students and staff of the institution about the safe usage of these cords. Ensuring safety and raising awareness among individuals is very important, as knowledge is wealth. The electrical hazard posed a significant risk of death and injuries to the individual; therefore, attention to safety is necessary as the first step in any environmental setup [24]. The importance of product testing and standards is added to the list of lifelong instructions on fire and life safety that we strive to instil [25].

4. CONCLUSION

This study investigated the level of students' awareness and adherence to extension cord safety measures to reduce the frequency of extension cord-related fires in their various halls and hostels at HTU. From the study, it has become clear that most of the selected users of extension cords in the University are not well informed or aware of the electrical hazards, safety measures and practices associated with the use of extension cords. No wonder the implications of these have been seen in the number of electricity accidents witnessed in various halls of residence in academic institutions. The knowledge of safety measures needs to be passed on to electricity users, as knowledge is the seed of tomorrow's change. To avoid all forms of electricity accidents in schools, offices and homes, all hands must be on deck to see that extension cord users have adequate awareness of electrical hazards and safety education before acquiring one for use. The university should immediately organize a seminar to educate the staff and students about the use of the extension cord. Alternatively, students should be thoroughly informed of the safety practices that will aid in safeguarding the lives and property of other users of electrical extension cords through the use of safety posters, public lectures, and other forms of communication by specialists from the Engineering Department. Finally, consumers should only purchase extension cords that have been endorsed by an autonomous testing laboratory.

Based on the findings, some recommendations have been made to improve safety awareness of extension cord use and proper selection based on application to prevent fires in tertiary institutions and homes. Buy only Underwriters' Laboratories (UL) or Ghana Standard Authority-approved extension cords with embossed labels. The extension cord is approved by the testing facility, demonstrating that it meets pertinent prerequisites. Extension cords must be used within their wattage or ampere ratings. Before buying, compare appliance and cord ratings. Connecting electrical devices with three-pronged plugs requires three-conductor extension cords. If the earthing system works, this prevents electric shock. Plug only one appliance into the extension cord. Overloading electrical cords or circuits can cause an electrical fire because the outlet can't handle the extra electrical flow. Extension cords should not be routed through doorways, mattresses, or windows that can close and damage them. Finally, extension cord splicing must be done professionally to avoid short circuits and fires. Typically, the repair is not cost effective and can only be performed by an experienced and qualified electrician. Extension cords are only to be used for short-term purposes and only when necessary. They don't substitute for the requirement for the establishment of outlets and legitimate wiring where essential. The following guidelines, stated as recommendations above, should be adhered to by students and other users when purchasing, using, and after using extension cords to guarantee that they do not infringe on good safety practices or fire codes. Remember, the combination of safe products and safe practices produces a safe environment.

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