CLIMATE CHANGE EDUCATION IN MALAWI: EXAMINING LEARNERS' KNOWLEDGE, ATTITUDES AND PRACTICES TOWARDS LEARNING CLIMATE CHANGE EDUCATION CONTENT IN SENIOR SECONDARY SCHOOLS

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Abstract

In this study, the researchers examined learners' knowledge, attitudes and practices towards learning Climate Change Education (CCE) content in senior secondary schools in Malawi. The mixed method convergent parallel design was employed. Data was collected from 64 participants consisting of learners in 8 secondary schools in two education divisions. Questionnaires and focus group discussions were used to collect data. Quantitative data was analysed using SPSS, while qualitative data was analysed thematically. Results indicate that 56.9 per cent of learners had little knowledge of CC. In terms of attitudes, 73.4 per cent agreed that learning CCE content makes them worried about the environment. It was found that an average of 66.9 per cent of the learners did not have a variety of CCE practices for mitigating and adapting to CC. It was recommended that the senior secondary school curriculum should be revised to include CCE content and activities that are likely to promote learning through practice.

Keywords: Climate Change Education, Curriculum, Knowledge, Attitudes, Practices

Introduction

Climate Change (CC) is one of the most threatening global environmental challenges of the 21st century. Barack Obama, the 44th president of the United States of America, once said, 'No challenge poses a greater threat to future generations than climate change' (Vaughter, 2016). The former Secretary General of the United Nations, Ban-Ki-Moon, also described climate change as a major overriding environmental issue of our time and the single greatest challenge facing decision-makers at many levels of society (United Nations, 2014). Indeed, the 21st century is a time when the whole planet is threatened by human environmental decisions and actions (United Nations, 2014). UNESCO (2015) defined CC as a global phenomenon of climate transformation that is characterised by the changes in the usual climate of the planet regarding temperature, precipitation and wind that are especially caused by human activities.

The Intergovernmental Panel on Climate Change (IPCC) defined CC as a change in the state of the climate that can be identified by changes in the mean or the variability of its properties, and that persists for an extended period, typically decades or longer (UNFCCC, 2011). The IPCC Working Group I Sixth Assessment

Report released on 6 August 2021 warned that the world surface temperatures could increase by 1.0^0C to 5.0^0C by the end of this century (IPCC, 2021). The anthropogenic activities such as deforestation and industrial activities have led to high production of greenhouse gases that contribute to CC, which creates the most significant challenge to achieve sustainable development (Lynch, Cain and Pierrehumbert, 2021).

In Malawi, it is indisputable that CC is taking place because the evidence can be seen almost everywhere. For instance, Figure 1 shows Rumphi secondary school, which was damaged by strong winds and heavy rainfall in 2017. This disrupted learning at the school because learners could not use the classrooms. The books in the library were completely damaged. Teachers could not teach the learners because they were psychologically affected as their houses were severely damaged.

Figure 1: Rumphi Secondary School Damaged by Strong Winds and Heavy Rainfall in 2017 https://malawi24.com/2017/10/30/strong-winds-destroy-schools-rumphi

In recent years, the Southern Region of Malawi has been more vulnerable to the effects of CC. For instance, Cyclone Idai, in 2019, Cyclone Gombe and Cyclone Ana, in 2022, and Cyclone Freddy, in 2023 seriously affected the Southern Region of Malawi. Infrastructure such as roads, bridges, schools and health facilities were severely damaged. The effects of these cyclones have undermined development efforts and most severely affected the poor. Figure 2 shows Zalewa Road in Blantyre District, which was cut by Cyclone Freddy in March 2023. This is just but one of the roads, bridges and infrastructure that were badly damaged.

Figure 2: Zalewa Road in Blantyre District Cut by Cyclone Freddy in March, 2023
Source: Department of Disaster Management Affairs in Malawi (2023)

Since the future of humans depends on the actions that humans themselves take today, UNESCO (2021) pointed out that Climate Change Education (CCE) can be a tool for promoting CC awareness among the learners and all individuals in the communities. Learners are key in this because they are ultimately the future leaders and decision-makers. Therefore, learners who have a high level of knowledge and good attitude towards CCE are likely to develop good practices on sustainable use of resources and help in combating CC (Othman and Mahmud, 2021). Learners who have gained knowledge through CCE are likely to translate what is learnt to other related situations. Rahman, Tasmin, Uddin, Islam and Sujauddin (2014) explained that knowledge of CC may help learners develop a sense of responsibility in managing the environment. Learners can understand better the causes of CC and most likely respond efficiently by solving the local problems that lead to CC. However, Chappin, Bijvoet and Oei (2017) argued that knowledge helps in more sustainable attitudes and behaviours, but it is not a guarantee that people will change habits and behavior based on what they know.

The Focus of Climate Change Education in Malawi

Malawi is a signatory to several international conventions that address CCE and awareness. Consequently, some programmes have been put in place to implement agreed protocols and conventions (Joshua and Namphande, 2014). There has been a lot of effort directed towards CCE and awareness in the country. For instance, the Malawi Institute of Education (2015) developed a CC sourcebook to help in equipping learners with the acquisition of knowledge, attitudes and practices about CC adaptation, mitigation and resilience. The book was developed with support from UN CC: Learn and the United Nations Development Programme (UNDP). Climate change education focuses on the following areas: transformation, mitigation, adaptation and understanding and attentiveness. This is illustrated in the CCE transformation model in Figure 3.

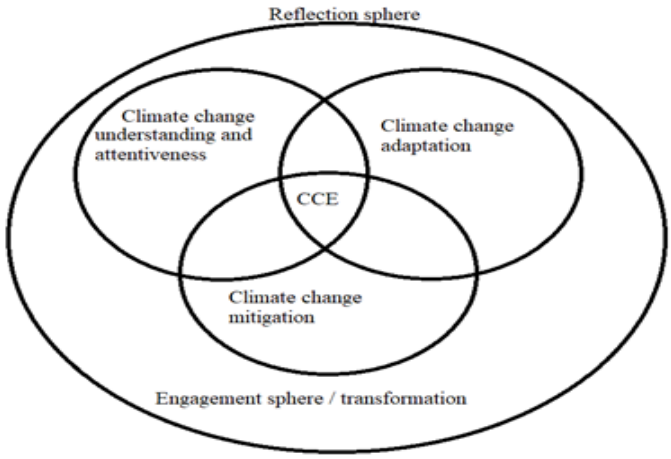

Figure 3: The Transformative Model in Climate Change Education
Source: UNESCO (2020)

As illustrated in Figure 3, CCE emphasises the need for transformation at all levels of society, from individual to institutional, from local to global (UNESCO, 2020). Climate change education can help secondary school learners to understand the driving forces behind CC and create a mindset of alertness to changes that are occurring. Mitigation is another dimension of CCE that learners are supposed to understand. This means doing something to reduce or relieve a situation (UNESCO, 2020). It is about identifying the causes of CC and developing the knowledge, skills, attitudes and practices required for individual and societal change to address the causes. For instance, the root cause of CC is greenhouse gas emissions. At this level, education for CC mitigation may cover the various levels and types of energy consumption, the shift to non-polluting renewable energy sources, energy conservation, environmental conservation, reforestation and afforestation.

The adaptation dimension of CCE relates to building resilience and reducing vulnerability in the face of CC impacts that are already happening or are soon to happen. The learning may be technical, for example, learning about drought-resistant farming practices, or flood management behaviours. It is necessary that learners should learn by doing, so that they can develop better practices for CC adaptation. Climate change education should assist learners to develop knowledge, attitudes and practices in all the dimensions illustrated by the transformative model of CCE in Figure 3. As mentioned in the abstract, this article is based on a study in which researchers examined learners' knowledge, attitudes and practices toward learning CCE content in senior secondary schools in Malawi.

Methodology

A mixed-method convergent parallel design was adopted for this study. The qualitative

and quantitative data were mixed at the interpretation stage and there was an added value in combining them (Creswell and Plano Clark, 2018). In other words, mixing two data sets of the qualitative and quantitative form helped to produce a more complete picture and provided an opportunity for a greater assortment of divergent and complementary views; which were valuable and enriched the understanding of the phenomenon (Dawadi, Shrestha and Giri, 2021).

A sample of 64 learners from 8 schools in Shire Highlands Education Division (SHED) and South West Education Division (SWED) was used. Of the 64 learners, 32 were from 4 schools in SHED in the following districts: Phalombe, Mulanje, Thyolo and Chiradzulu. The other 32 learners were from 4 schools in SWED in the following districts: Blantyre, Mwanza, Chikhwawa and Nsanje. Simple random sampling was used in the selection of 4 schools per educational division. Simple random sampling was also used in the selection of 8 learners per school, specifically at the senior secondary school level. The study used questionnaires and focus group discussions as data collection methods and instruments. Questionnaires were distributed to all the 64 learners in the 8 secondary schools. Quantitative data was analysed using SPSS version 28, while qualitative data was analysed thematically.

Literature Review

This section provides a brief review of related literature about learners' knowledge, attitudes and practices in climate change education.

Learners' Knowledge, Attitudes and Practices in Climate Change Education

The international community recognises education as one of the tools for addressing CC. Muchanga and Nakazwe (2015) described education as a right of all individuals and a means of enhancing well-being and quality of life in a changing environment where CC is a big challenge. Nhamo and Shava (2014) explained that CCE helps learners understand and address the impacts of CC, empowering them with the knowledge, skills, values and attitudes needed to act as agents of change. The UN Framework Convention on Climate Change (UNCCC), the Paris Agreement and the associated Action for Climate Empowerment (ACE) agenda all call on governments to educate, empower and engage all citizens on policies and actions relating to CC (UNESCO, 2021). Stevenson, Nicholls and Whitehouse (2017) proposed that the goal of CCE is to prepare learners for an uncertain future by helping them gain knowledge, skills, dispositions and values that will enable them to deal with future challenges. Othman and Mahmud (2021) explained that learners who have high levels of knowledge, risk perception and good attitudes towards CCE are likely to have good practices about the sustainable use of resources. Learners who have gained knowledge through CCE are likely to realise that the future of the planet is in their hands. In a study that was conducted in Izrael by Seroussi, Rothschild, Kurzbaum and Hemo (2019), it was found that learners' level of knowledge about CC in secondary

schools was low. Both learners and teachers had misunderstandings and gaps in the knowledge of the causes and consequences of CC. They both did not show positive attitudes and behaviours to reduce CC effects. Regarding attitudes with respect to environmentally-friendly behaviour, many learners displayed a lack of willingness to act in an environmentally-friendly way. Similarly, findings in a study by Crayne (2015) in high schools in Western Oregon, in the United States of America, revealed that learners had feelings of fear, sadness, and guilt in response to difficult environmental topics, including CC. Some learners got depressed that the problem of CC was too big to solve. Even some teachers expressed concern about making learners feel bad. However, it is the responsibility of teachers to find better ways of managing learners' emotions when teaching them about CC. Learners should understand that the future of the Earth is in their hands and that they should start taking action to combat CC.

Falaye and Okwilagwe (2016) conducted a study in secondary schools in Nigeria aimed at assessing learners' knowledge, attitudes and practices of CC. The findings revealed that the knowledge of CC was slightly low in learners and the attitude to CC was slightly favourable. To improve learners' knowledge, attitudes and practices in CC mitigation, adaptation and resilience; Falaye and Okwilagwe (2016) suggested that the secondary school curriculum should be revised. It should be designed to assist learners increase knowledge and adopt positive practices as CC affects everybody in the society. Christensen and Knezek (2015) explained that educating learners about CC may help to create responsible citizens who are likely to make informed decisions regarding the environment in the future.

In a study that was conducted by Kutywayo, Chersich, Naidoo, Scorgie, Bottman and Mullick (2022) in secondary schools in Western Cape, South Africa, it was found that there were major gaps in knowledge about the causes and manifestations of CC among learners. An average of 37.1 per cent of the learners answered the questions for testing knowledge correctly. This indicated that few learners had knowledge about CC. In Zimbabwe, Ncube and Tawodzera (2019) found that 40 per cent of the learners in secondary schools did not know that CC was due to human activity. In another study in Zimbabwe by Kupika *et al*. (2019), it was found that learners in rural areas attributed CC to 'sin', 'a mystical phenomenon', 'spiritual forces' or to 'negative' cultural changes that have occurred in recent times. It is, therefore, necessary that CCE should be emphasised in schools so that learners develop new knowledge and change their attitudes on how they think about CC.

In terms of the practices, Larue, Jacques and Munang (2016) found that learners in ten secondary schools in Seychelles organised a project for rainwater harvesting as a means of adapting to water problems caused by CC. They also installed rainwater harvesting equipment, such as water tanks and roof gutters. In most cases, once learners have learned about CC, they often want to take action in response to what they have become concerned about. According to Anderson (2012), CCE offers an opportunity to act to reduce the impacts of CC. In Malawi, learners in schools are given a chance to take part in planting tree seedlings every year in January.

For instance, learners of Khongoloni Secondary School in Phalombe District planted more than 500 tree seedlings in the 2022/2023 rainy season. This is one of the practices aimed at mitigating CC. Sharm (2020) explained that learners in schools should be engaged in practices, such as planting tree seedlings and planting drought-tolerant crops in school gardens. Therefore, it is necessary that learners in secondary schools in Malawi become active in such practices to fight CC.

Results and Discussion

In this section, the results of the study are presented and discussed focusing on learners' knowledge, attitudes and practices about climate change education.

Learners' Knowledge, Attitudes and Practices towards Learning CCE Content

Questionnaires were distributed to 64 learners to find out their knowledge, attitudes and practices towards learning CCE content. Later, focus group discussions were also conducted with 8 groups of learners.

Knowledge

To find out the learners' knowledge about CCE, ten questions based on the learners' understanding of CC mitigation and adaptation, the different causes of CC, the different consequences of CC, ways of mitigating CC and ways of adapting to CC were provided in the questionnaire for learners to indicate their understanding. The results were as shown in Table 1. It should be noted that the correct responses for the questions are in bold sentences.

Table 1: Frequency and Percentage Distribution of Learners' Knowledge about Climate Change Education

	Questions	Responses	f	%
1	What do you understand by the term climate change mitigation?	Human activities aimed at reducing vulnerability	36	56.2
		Human activities to prevent climate change from happening	5	7.8
		Activities that reduce the level and intensity of greenhouse gas emissions	17	26.6
		Natural and human adjustment to reduce vulnerability and take advantage of opportunities brought about by climate change	6	9.4
2	Which gas has seriously increased in concentration and is the main cause of greenhouse effect, which leads to climate change?	Methane (CH4)	4	6.3
		Carbon dioxide (CO2)	43	67.2
		Ozone (O3)	10	15.6
		Chlorofluorocarbons (CFCs)	7	10.9
3	What can be the main cause of the depletion of the ozone layer?	Pollution from land-fills	3	4.7
		Emissions of CFCs into the atmosphere	36	56.3
		The increasing temperature of sun's rays	14	21.8
		Burning of fossil fuel	11	17.2
4	Why are forests important for mitigating climate change?	Forests serve as a sink in the carbon cycle	22	34.4
		Trees provide building materials	37	57.8
		Trees are an important food source	2	3.1
		Leaves of trees reflect all sunlight away from the earth	3	4.7

5	Which of the following choices best represents a way to mitigate carbon dioxide emissions?	Drive more cars	3	4.7
		Burn more coal	1	1
		Cut down more trees	35	54.7
		Use solar energy	25	39.1
6	What do you know about climate change adaptation?	Human activities to prevent climate change from happening	9	14.1
		Human activities to reduce temperature rise on Earth	6	9.3
		Human activities to reduce the level and intensity of greenhouse gas emissions	36	56.3
		Human actions that reduce the negative impact of climate change, while taking advantage of potential new opportunities brought by climate change	13	20.3
7	Where does the largest source of greenhouse gas emissions caused by humans come from?	Industrial processes	42	65.6
		Electricity and heat	6	9.4
		Transportation.	9	14.1
		Buildings	7	10.9
8	Which of the following is not a way to adapt to climate change?	Build dams to protect shore line from flooding	3	4.7
		Plant different crops that can better stand a changing climate	6	9.4
		Reduce use of fossil fuels	18	28.1
		Wear light coloured clothes on hot days	37	57.8
9	What happens when global average temperature increases?	The average precipitation decreases	11	17.2
		The average precipitation increases	41	64.1
		The average precipitation remains unchanged	5	7.8
		Precipitation becomes unpredictable	7	10.9

From the results in Table 1, questions 1, 4 and 5 tested learners' knowledge about CC mitigation. In question 1, which focused on the understanding of the term climate change mitigation, only 26.6 per cent answered the question correctly. While in question 4, which required learners to indicate why forests are important for mitigating

climate change, only 34.4 per cent of the learners answered it correctly. In question 5, a question based on the way to mitigate carbon dioxide emissions, few learners (39.1%) responded correctly. On average, 33.4 per cent of the learners responded to questions on CC mitigation correctly. This meant that most learners had little knowledge about CC mitigation. There are also gaps in learners' knowledge of CC as indicated in the responses to the questions 2, 3 and 9.

The other set of questions, 6 and 8, were about CC adaptation. In question 6, where learners were required to indicate what they knew about CC adaptation, only 20.3 per cent responded correctly. In question 8, learners were required to single out a way that was not suitable for the adaptation to CC. In this question, only 28.1% answered correctly. This showed that an average of 24.2 per cent answered the questions on CC adaptation correctly. The implication is that most learners had scanty knowledge about CC adaptation. The picture is almost the same for the other set of questions as not more than half got the questions right.

As a way of triangulating the questions in the questionnaires, focus group discussions were done focusing on the same CC dimensions. The results were similar to what was found in questionnaires. Most learners gave wrong answers to questions that tested their knowledge about CC mitigation and adaptation. For instance, the learners were asked to distinguish between CC mitigation and CC adaptation. The following were some of the responses of learners in their focus groups:

In focus group 1 (FG1), one of the participants explained as follows:

> I think climate change mitigation is change of human behavior to reduce vulnerability and take advantage of opportunities by climate change, while climate change adaptation is when people do activities that reduce greenhouse gas emissions.

In focus group 2 (FG2) it was agreed by the discussants that;

> Climate change mitigation is when more trees are planted to reduce the level of carbon dioxide in the atmosphere, while climate change adaptation are activities that address the causes of climate change.

On the other hand, in focus group 4, an explanation was given by one of the participants to which the other members agreed that;

> I think in climate change mitigation, the focus is on addressing the causes of climate change, while in climate change adaptation the focus is on addressing the consequences of climate change.

Additionally, in focus group 8 (FG8) it was agreed by the group that;

> Climate change mitigation is change of human practices to reduce vulnerability to climate change, while climate change adaptation is when people do activities that reduce carbon dioxide in the atmosphere.

Out of the four responses, only FG4 gave the correct answer, while the other three responses in FG1, FG3 and FG8 gave the wrong answers. The results were not different from what Falaye and Okwilagwe (2016) found in secondary schools in Nigeria that learners' knowledge on CC mitigation and adaptation was low as most learners failed to distinguish between the two concepts. In this study, Falaye and Okwilagwe (2016) recommended that the curriculum should be revised to include CCE content that can assist in improving learners' knowledge on CC issues. The knowledge of CCE is significant for learners if they are to change their attitudes towards CC for the better.

Further, the results in Table 1 indicated that an average of 63 per cent of the learners responded to questions, 2, 3 and 7 in the category of the causes of CC correctly. This implied that most learners had good knowledge of the causes of CC. Additionally, an average of 66.5 per cent of the learners also answered questions 9 and 10 on the effects of CC correctly. This showed that the majority of learners had good knowledge about the effects of CC. The results for all the 10 questions in all the categories have shown that an average of 43.1 per cent of the learners responded to the questions correctly. This implied that more than half of the learners had little knowledge about CC. The results were similar to Kutywayo *et al.,* (2022) who found that an average of 37.1 per cent of the learners answered the questions on CC knowledge correctly, which pointed to the fact that few learners had knowledge about CC.

Similarly, Ncube and Tawodzera (2019) found that 40 per cent of the learners in secondary schools in Zimbabwe had little knowledge about CC. For instance, most learners did not know that CC was due to human activity. It is interesting, however, to note that learners in this study answered the questions (9 and 10) on the effects of CC correctly. This may be a result of what the learners in Malawi are experiencing regarding the effects of CC. This is a good starting point if the implementation of CCE is introduced in the Malawian curriculum since learners already experience the effects of CC. UNESCO (2020) recommended that CCE should be emphasised in schools in order to equip learners with knowledge as the future of the planet is in their hands. The acquisition of knowledge should lead to change in attitude. Thus, in this study, we also had to find out the learners' attitudes on this phenomenon.

Attitudes

As a way of measuring their attitudes about CCE, learners were asked to indicate on a three-point Likert scale what their views towards learning CCE content in senior

secondary school curriculum was. The questions focused on the learners' concerns for the future, readiness to act, readiness to make changes in the way of life and readiness to influence others in their community among others. The results are as shown in Table 2.

Table 2: Frequency and Percentage Distribution of Learners' Attitudes Towards Learning CCE Content

Item	View	Agree		Not sure		Disagree		Total	
		f`	%	f`	%	f`	%	f`	%
1	Learning about climate change makes me get worried about the future	47	73.4	3	4.7	14	21.9	64	100
2	I am ready to learn Climate Change Education content though it frightens me	45	70.3	1	1.6	18	28.1	64	100
3	I am ready to influence people in my community to act in a way which diminishes global warming	42	65.6	2	3.1	20	31.3	64	100
4	After learning Climate Change Education content, I am now ready to change my way of life and adapt to climate change	45	64	1	1.6	22	34.4	64	100
5	I feel like learning Climate Change Education content is a waste of time because nature controls itself	18	28.1	4	6.3	42	65.6	64	100
6	We cannot stop cutting down trees because God gave an authority for man to control everything	22	34.4	2	3.1	40	62.5	64	100

The results in Table 2 indicate that most learners, 73.4 per centagreed that learning about CCE content made them get worried about the future. This was followed by 70.3 per cent of the learners who responded that they were ready to learn CCE content though it frightened them. Additionally, 65.6 per cent of the learners indicated that they were ready to influence people in their communities to act in ways, which can diminish global warming. On the other hand, 64 per cent of the learners indicated that after learning CCE content, they were ready to change their ways of life and adapt to CC. Further, 65.6 per cent of the learners disagreed that learning CCE content was a waste of time because nature controls itself. Finally, 62.5 per cent of the learners disagreed that they could not stop cutting down trees because God gave authority to man to control everything. Generally, the results indicated that although learners got worried about CC, the majority of them were willing to change their behaviours in favour of CC and were ready to take action to adapt and mitigate CC.

The results through questionnaires were not very different from what was found in focus group discussions with learners. When they were asked to explain how they felt about learning CCE content, learners responded that they got worried about their future. However, they said that they were ready to disseminate information about CC in their communities and were also ready to change their behaviours and take action by aiming at mitigating and adapting to CC. Table 3 shows some of the responses by learners in their groups.

Table 3: Learners Responses on How They Felt (attitudes) about Learning CCE Content

Item	Learners' responses about learning CCE content	Focus groups
1	*I become worried thinking that climate change may destroy my future (26)*	FG1; FG2; FG3; FG4; FG5; FG6; FG7; FG8.
2	*I feel frightened when I learn about the effects of climate change, for instance, loss of lives and properties (22)*	FG1; FG2; FG3; FG4; FG5; FG6; FG7; FG8.
3	*I am enthusiastic to change behaviour and take quick actions before climate change becomes worse (8)*	FG1; FG4; FG5; FG7; FG8.
4	*I am ready to disseminate information about climate change in my community (6)*	FG3; FG4; FG7; FG8.
5	*I appreciate that it is our responsibility to take care of the environment by planting more trees (5)*	FG1; FG5; FG6; FG8.

The results from focus group discussions in Table 3 have shown that 26 of the learners in all the focus group discussions expressed concern that they become worried when

learning about CCE content because of what they came to know about it. This is followed by 22 learners again in all the groups who also mentioned that they felt frightened when learning about the effects of CC due to loss of life and property. Further, 8 learners in 5 groups namely; FG1, FG4, FG5, FG7 and FG8 said that they become enthusiastic to take quick actions before CC becomes worse.

As indicated in both Tables 2 and 3, most learners got worried about the future when they learned about CC. Similar results were obtained by Kaplan and Guskin (2019) in the United States of America (USA) who found that 13 to 17 year-old learners got worried and expressed fear and anger around the scientific topic of CC. This finding is quite interesting and significant given that the finding is coming from two groups of young people who are in two different places and environments. According to Robertson and Barbosa (2015), learners educated in the USA got more of their information about CC from social media than from the classroom. Additionally, in studies by Seroussi *et al.*, (2019) in Israel, and Kutywayo *et al*., (2022) in South Africa, it was found that learners in secondary schools equally expressed worry about their future when learning about CCE content. Falaye and Okwilagwe (2016) suggested that teachers should choose better ways of teaching CCE content so that learners accept that they were in the most difficult time that needed to take quick actions. Kutywayo *et al.,* (2022) added that fear or worry cannot solve a problem but what was needed was to find solutions for local problems that related to CC. However, the worry and fear expressed by learners regarding CC is an indication that they understood the seriousness and consequences of CC and they could make good use of their education on the matter if they were supported.

It is for this reason that teachers need to use transformative approaches such as climate action in order to make learners develop even stronger and positive attitudes and become active in fighting CC rather than being worried about the results of CC without taking any action (UNESCO, 2021). Therefore, secondary school teachers in Malawi should work towards using best approaches to ensure that learners in secondary schools acquired appropriate and positive attitudes towards learning CCE content so that they can take appropriate and informed action in CC mitigation, adaptation and resilience.

Practices

In the questionnaire, learners were also asked to indicate the extent of their practices in the process of learning CCE content in senior secondary school curriculum. The results are shown in Table 4.

Table 4: Learners Practices When learning CCE Content

Item	Practice	Agree		Not sure		Disagree		Total	
		f	%	f	%	f	%	f	%
1	We have a waste management project at our school	9	14.1	2	3.1	53	82.8	64	100
2	We plant drought tolerant crops in school garden	12	18.7	1	1.6	51	79.7	64	100
3	We harvest rainwater and use it for irrigation in the dry season	14	21.9	2	3.1	48	75	64	100
4	We create and paste posters with climate change messages	11	17.2	5	7.8	48	75	64	100
5	We have planted trees in the surrounding community	36	56.3	2	3.1	26	40.6	64	100
6	We have club activities aiming at mitigating climate change	22	34.3	1	1.6	41	64.1	64	100
7	We conduct awareness activities about climate change in the surrounding community	21	32.8	4	6.3	39	60.9	64	100
8	We always have a special day in a month for cleaning the environment	24	37.5	3	4.7	37	57.8	64	100

From the results in Table 4, the majority of the learners (82.8%) disagreed that they had a waste management project at their school. This is followed by 79.7 per cent of

learners who disagreed that they planted drought-tolerant crops in their school garden. Furthermore, 75 per cent of the learners disagreed that they harvested rainwater and used it for irrigation in the dry season. Additionallly, 75 per cent of the learners disagreed that they created and pasted posters with CC messages. However, 56.3 per cent agreed that they planted trees in the surrounding community but 64.1 per cent disagreed that they had club activities aiming at mitigating CC. About 60.9 per cent disagreed that they conducted awareness activities about CC in the surrounding community. Finally, 57.8 per cent of learners disagreed that they always had a special day in a month to clean the environment.

From the results, an average of 66.9 per cent of the learners did not have CCE practices for mitigating and adapting to CC. This is different from what Larue, Jacques and Munang (2016) found in ten secondary schools in Seychelles. According to Larue *et al.* (2016), three scholars in Seychelles reported that the learners organised a project for rainwater harvesting as a means of adapting to water problems caused by CC. They also installed rainwater harvesting equipment such as water tanks and roof gutters. In most cases, once learners have learned about CC, they often want to take action in response to what they have become concerned about. In South Africa, Thenga, Goldschagg, Ferguson and Mandikonza (2021) found that the Fundisa for Change programme assisted teachers to use transformative learning framework by engaging learners in practices for CC mitigation and adaptation. This could be a good model to try in Malawi since there seem to be very minimal practice orientation to CC.

According to UNESCO (2021), it is critical that CCE practices be embedded in the learning of CC. It should not just be learning CCE content in class, but it should be about understanding how everything they do is affected by CC and they must take immediate action to mitigate CC. According to Anderson (2012), CCE offers an opportunity to learners to act in order to reduce the impacts of CC. Sharm (2020) recommended teachers in schools to engage learners in practices such as waste management, water harvesting, planting tree seedlings and planting drought-tolerant crops in the school garden. The rainwater that learners can harvest may be used for the irrigation of crops in the school garden and for watering tree seedlings. Generally, there is a need to improve these CCE practices in secondary school curriculum in Malawi so that learners have best practices in solving CC problems.

Although an average of 66.9 per cent of the learners were not involved in CCE practices for mitigating and adapting to CC, 56.3 per cent of the learners agreed that they took part in planting trees in their communities. This is one of the good practices that learners are supposed to do as part of mitigating CC. Similarly, Bekele (2015) found that secondary school learners in Ethiopia had tree-planting projects, which yielded numerous sustainable benefits. It was observed that learners simulated the spirit of planting tree seedlings in their homes with the help of their parents, hence, creating a conscious generation towards conservation of forests and combating CC. Bekele (2015) further revealed that school clubs were influential in tree planting and sensitisation on tree plantations in schools and communities in Ethiopia. By engaging

learners in clubs, planting trees and exposing them to CCE lessons would go a long way in creating a CC-friendly society. A study in England revealed that, where learners are engaged in CCE-related lessons, it brings consciousness to environmental issues and protection (Turtle, Convery and Convery, 2015). The Malawi Institute of Education (2015) reported that in Malawi, both primary and secondary school learners are given a chance to take part in planting tree seedlings every year starting in December. This is good and must be encouraged in all schools so that learners are most likely transformed into active and responsible citizens in fighting CC.

Conclusion and Recommendations

In this article, researchers examined learners' knowledge, attitudes and practices towards learning CCE content in senior secondary schools in Malawi. It can be concluded that the level of knowledge for learners in CCE is quite low as most learners failed to answer the questions on CC mitigation and adaptation correctly. In terms of attitudes, most learners get worried when learning about CCE content. However, it was found that most learners were ready to learn CCE content though it frightened them. We can, therefore, conclude that although learners have little knowledge of CC, they seem to have the right potential to develop desirable attitudes towards CC. It was also revealed that most learners were not involved in a variety of CCE practices for mitigating and adapting to CC such as water harvesting and waste management projects and others. We can, therefore, conclude that learners' practices were quite inadequate given the gravity of CC effects in Malawi that are so real and currently disrupting the normal social livelihoods. It is important to stress that the right CC practices are inevitable if learners in Malawi are to effectively be prepared as future leaders of the nation.

It can be recommended that to help improve learners' knowledge, attitudes and practices in CCE, there is a need for curriculum review so that it should have CCE content and practical activities in all the subjects. In other words, the school curriculum in Malawi should have many sustainable practical activities for mitigating and adapting to CC. For instance, learners should take part in activities such as waste management, planting tree seedlings, water harvesting and planting drought-resistant crops in school gardens. This can holistically transform the learners in terms of knowledge, attitudes and practices for combating CC. Learners should form clubs where they can share knowledge and organise CC projects.

Additionally, teachers should employ transformative approaches in the teaching of CCE content. This can enhance learners' knowledge and help them change attitudes and behaviours on how they interact with the environment. It should always be remembered that the future of the planet is in the hands of everyone and delaying to take action on CC may lead to disastrous consequences. But more importantly, the future of the planet is very much dependent on today's youths who now happen to be in school. Thus, the school curriculum should be tailored in such are way that it prepares

them for sustainable living in terms of management, mitigation and adaptation to climate change.

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