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Message from the Editor

Greetings to our colleagues from all parts of the world. As the editor of Journal of Action Qualitative & Mixed Methods Research (JAQMER), I would like to welcome you to Volume 3, Issue 1.

This edition contains of two articles on qualitative research and one on action research that we believe will assist you, the reader, in conceptualizing and solving problems related to developing research or a manuscript with a qualitative and an action research design.

The first article, which is called 'Applying socio-ecological perspectives semantic networks in managing community conservation areas in Ghana' is a qualitative study with descriptive phenomenological design. The aim of this study was to identify key nature conservation themes and their semantic interrelationships that could be considered in the establishment and management of Community Resource Management Areas (CREMAs) in Ghana.

The second article, which is called 'Exploring the potential of play-based learning interventions for academic success: An action research project on improving preschool students' number mastery', is a participatory action research. The aim of this study was to improve preschool students' number fluency through a six-week play-based learning intervention.

The third article, which is called 'Students, teachers and principals' views on the effects of school gyms on functioning of school' is a qualitative study with a descriptive phenomenology design. The aim of this study was to interpret the views of principals, teachers and students on the effects of gyms in schools on students, teachers, principals and the general functioning of the school.

These articles are designed to offer thoughts, insight, suggestions, samples and ideas on qualitative and action researches. According to the guidance and the results of articles in this issue, researchers could shape their future action and qualitative researches.

We hope you enjoy the articles in this volume 3 issue 1 of the journal and find them informative and useful for designing and developing action and qualitative researches. Please remember that articles published in JAQMER do not reflect the position of the journal's editorial staff, reviewers.

Dr. İlhan Gunbayi
JAQMER Editor

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Applying socio-ecological perspectives semantic networks in managing community conservation areas in Ghana

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Abstract: This study purpose was to identify key nature conservation themes and their semantic interrelationships that could be considered in the establishment and management of Community Resource Management Areas (CREMAs) in Ghana. A qualitative descriptive phenomenological approach was used to interview nine CREMA leaders from three different locations in northern Ghana. Seventeen major socio-ecological themes were identified under three nature conservation domains of: 1) conservation objectives, 2) risk management and 3) sustainable economic opportunities. Three semantic networks were developed under the central domains where the 17 themes served as labelled nodes interlinked with seven labelled links of: 1) *is part of*, 2) *is associated with*, 3) *promotes*, 4) *produces*, 5) *is cause of*, 6) *is property of*, and 7) *contradicts*. The study findings indicate that there are intricate interrelated socio-ecological issues that CREMA managers should understand and appreciate to attain sustainable benefits. The application of livelihood incentives, creating awareness and law enforcement are key activities managers must implement together with others to achieve sustainable benefits in the CREMAs.

Keywords: CREMA, phenomenological studies, semantic networks, sustainability

Introduction

Collaborative nature conservation principles are implemented in an attempt to perfect human-nature interrelationships (Vining et al., 2008) especially in the utilization of natural resources to promote viable nature based enterprises that produce sustainable benefits (Drexhage & Murphy, 2010). Proponents of collaborative nature conservation principles suggest the involvement of local people helps in achieving both conservation and socio-economic development goals among multiple actors with their complex interrelationships on the communal landscape. Conley & Moote (2001) for example stated the involvement of local people in nature conservation is required because: 1) they depend on the resources for livelihoods, 2) they have in-depth knowledge in the management of the resources, and 3) central government management alone is insufficient due to corruption and inadequate funding. Again, local people demonstrate their participation with responsibility and stewardship towards nature to improve their conservation goals and socio-economic development (Lockwood et al., 2010).

Collaborative nature conservation principles implementation is also important to avoid nature utilization rights exclusion; where the most powerful concessionaires enjoy the better share to the neglect of the weak who may reside in the affected areas. Again, Conley & Moote (2001) asserted four issues ought to be considered during nature conservation planning and development if the problem of exclusion is to be eliminated. They are: 1) all actors should be allowed to state their interests, values, needs and

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concerns, 2) all identified issues should be included, 3) all actors should be engaged at all stages, and 4) all actors should be involved in the decision-making process.

However, contention always exists between different stakeholders' demands and expectations on biodiversity under conservation. Stakeholders' contentions range from local community members who feel they have been deprived of their rights to utilize biodiversity resources to merchants who think economic resources are being held without any utilitarian benefits. Also, these demands and expectations from community members and merchants are in opposition to the conservation practitioners' perspectives that promote non-consumptive values of biodiversity. Thus, implementing such multi-stakeholder engagements in collaborative nature conservation requires all the actors also to trade off entrenched stances to achieve compromised desirable goals (Kopnina, 2012).

Consequently, collaborative nature conservation programming which is seen as one of the panaceas to achieving sustainable biodiversity conservation and socio-economic development goals have been executed with participatory management approaches in many countries (Jones & Erdmann, 2013; Roe et al., 2009). Notwithstanding, the nature conservationists and socio-economic development policy makers are still confronted with a challenge to achieve a proper balance between the two opposing values on the communal landscape. This study applied qualitative semantic networks to explore an understanding and appreciation to the complex socio-ecological interactions (Rodrigues & Pietrocola, 2020) that occur in collaborative nature conservation ranges called Community Resource Management Areas (CREMAs) in Ghana.

Socio-ecological perspectives of participatory nature conservation

Agrawal & Gibson (1999) stated collaborative nature conservation programmes are founded on an image of a pristine ecosystem with an isolated local people who live in harmony on the landscape. The notion is that the local peoples' knowledge and the values they placed on the resources prevent them from abusing their control and utilization rights. The premise is that such an ecosystem with its human inhabitants is separated from the state and the negative effect of capitalism propelled by a free market system (Kopnina, 2012). Thus, promoting a pristine ecosystem that is free from human interferences from the conservationists' perspective which pits against the profit making industrialists' views of human socio-economic wellbeing contingent on commercial exploitation of natural resources.

Also, an ecosystem at its climax functions well with the capacity to provide services that benefit both human socio-economic demands and other biological species' functions. Striving to achieve such an ecosystem has framed the basis for setting up governance frameworks for both central government protected areas and off reserved management regimes even under community collaborative conservation. Biodiversity governance laws formulated to regulate natural resources utilization in protected and off reserved areas differ in many countries; with stringent application of laws in protected areas than off reserved areas (Shafer, 2015).

The above notwithstanding, the argument is that human interactions within ecosystems are historic which have changed the landscape many times, therefore, what is considered a productive ecosystem is as a result of human influences. Agrawal & Gibson (1999) pointed out that historical research suggests there is no truth in the assertion that community people are friendly to ecosystems because they live closer to the resources. That is, on the community collaborative conservation landscape, human interferences in the ecosystem still exist (Agyare, 2013; Brooks et al., 2013) and therefore community people's interaction with nature is a function of their utility interest (McDougal, 2010). Thus, it is the perspectives of actors involve in community collaborative resource management that determine whether outcomes generated from the consumptive and non-consumptive values of biodiversity are positive or negative.

Bixler et al. (2015) stated *participation* as used in collaborative conservation programmes lacks clarity because it is used to represent all sorts of nature conservation arrangements. The authors reiterated that in most cases the degree and the sort of participation is not clearly mentioned leading to all manner of challenges in the implementation of the resources governance arrangements. The myriad of actors, the

complexities and uncertainties associated with their interests, values, needs and concerns make participatory nature conservation implementation challenging (Brooks et al., 2013). Therefore participatory nature conservation governance should be built on citizenship engagement; considering its power relation, personal interests and benefits sharing arrangements (Agrawal & Gibson, 1999; Lockwood et al., 2010).

Again the definition of *community* in collaborative nature conservation programmes has been criticized; according to Agrawal & Gibson (1999), community in the conservation context has been defined as a small spatial area with homogenous people who share similar norms. The argument against this description is that it fails to identify the differences that exist in communities in regard to the processes, politics and alliances in nature conservation and its utilization arrangements. Defining a community as a small spatial area is a territorial concept that fails to acknowledge the movements of the people in and out of that space. Movements of people and their interactions with outsiders have impacts on their shared norms and the homogeneity that exist among them (Vining et al., 2008). Consequently, focus should rather be on the established communal norms that determine the outcomes of peoples' interactions and the political processes within communities.

Uncertainties and complexities in nature conservation exist due to: 1) knowledge gaps in different species interactions, 2) difficulties in understanding the intricacies in the interrelationships between species and their living environment (Stevens & Tello, 2011), and 3) unpredictable impacts of certain external factors like climate change (Sarkar et al., 2004). These uncertainties and complexities make Lockwood et al.'s (2010) call for greater integration and coordination to accommodate multiple factors in the temporal and spatial scales of nature conservation noteworthy. Participatory nature conservation programme implementation in the CREMAs thus seeks to improve the interactions and coordination among natural resources managers, scientists, policy makers and the general public to attain sustainable benefits where biodiversity resources are utilized to promote viable socio-economic development.

Participatory nature conservation issues in CREMAs

The CREMA model in Ghana is a participatory nature conservation institution built on local community governance structures to receive and implement a devolved authority from the central government (Agyare, 2013; Bandoh, 2010). A CREMA is operationally defined to represent a geographically demarcated area that has adequate natural resources or has the potential to improve the condition of the resources, for the locally established institution and governance structures to sustainably manage for communal benefits. The CREMA establishment objective is to encourage local people to integrate nature conservation into their farming and other legitimate land use systems (Asare et al., 2013) and to leverage on the governance structures to promote socio-economic wellbeing (Owusu-Ansah, 2021). The CREMA model does not follow strict nature protection regimes on the communal landscapes, but it provides opportunities for sustainable utilization strategies to be adopted by the local people. The model is a participatory nature conservation approach that promotes democratic communication channels for proper natural resources governance and conservation (Conley & Moote, 2001); provides incentives to reduce poaching (Agyare, 2013); seeks paths for sustainable socio-economic development (Drexhage & Murphy, 2010) and explores to perfect the interrelationship that exists between humans and nature (Vining et al., 2008).

The law in Ghana prescribes that all natural resources in protected areas and off protected areas belong to the state (Kotey et al., 1998 cited in Ekpe et al., 2014). This provision in the law to some extent marginalizes and excludes local people in the governance and utilization of the resources. Incorporating inclusive principles in developing the CREMA model with its benefit sharing arrangements in Ghana is not only aimed at addressing the problem of exclusion and marginalization, but also to conserve the resources for the benefits of current and future generations by creating a sense of ownership for the local people. The CREMA model seeks to achieve citizenship participation in rule-making (Agyare, 2013), and establish local institutions and governance structures to administer procedural justice on the agreed rules in nature conservation on the communal landscape (Conley & Moote, 2001).

According to Joseph et al. (2008) budgetary constraints, evolutionary distinctiveness of ecosystems and values placed on species are some considerations that influence conservation objectives. Similarly, CREMA conservation objectives are generally founded on the participating stakeholders' considerations on the biological and economic values placed on the resources and also their vulnerability to utilization pressures. Mostly, society places more emphasis on the socio-economic contributions of the resources to influence values placed on them (Kopina, 2012; Vining et al., 2008). However, the premium given to socio-economic importance of biological resources presents risks that threaten conservation objectives. Unfortunately, the threat to conservation objectives also undermines the economic values of the resources in the long term due to unsustainable harvesting (Game et al., 2013).

The CREMA model principles are beautifully crafted, however there are challenges that hinder their implementation. For example, implementers sometimes find it difficult to persuade some communities to accept the principles of the CREMA because such communities view the approach as a means for the central government to cunningly annex their lands for a protected area establishment. Shafer (2015) similarly reported how certain communities in Africa and Latin America view the creation of buffer zones along protected areas as external actors' way of incorporating those lands into the protected areas. Another implementation challenge is where CREMA members sometimes feel some of the restrictive and prohibitory sanctions that govern the CREMAs limit their economic livelihood activities; notwithstanding that those very regulations were generated by themselves (Bandoh, 2010). These challenges create disenchantment among community members (Agrawal & Gibson, 1999) leading to poaching, illegal logging and other unsustainable nature degradative practices like overgrazing and illegal fishing being continuously reported in the CREMAs. The above arguments indicate an understanding and appreciation of the interrelationships that exist among conservation objectives, conservation risks and sustainable economic opportunities of the CREMAs would promote effective management.

Two research questions were asked for this study. 1) What socio-ecological issues are considered most relevant by CREMA leaders to establish functional community conservation areas? 2) How do the socio-ecological issues identified logically interrelate with each other in semantic networks around three domains of (I) Conservation Objectives, (II) Risk Management and (III) Sustainable Economic Opportunities?

Application of semantic networks to CREMA conservation objectives, risks management and sustainable socio-economic opportunities

Semantic networks graphically represent knowledge which is made up of nodes and their relations (Osorio-Forero et al., 2019). Majumder & Khanra (2015) showed semantic networks are mainly made up of two parts. First, there is the vocabulary part that denote labeled nodes and labeled links. The second is the structural part made up of the nodes and the links' interrelationships that give meanings associated between nodes and links. The semantic networks used for this study were designed around three central domains.

Osorio-Forero et al. (2019) stated semantic network methodologies permit speedy and simplified meaning in modelling qualitative content. Other advantages of representing knowledge in semantic networks is its flexibility, transparency and beauty (Majumder & Khanra, 2015; Steyvers & Tenenbaum, 2005). However, semantic networks application in knowledge development has some shortfalls. The disadvantages include possible loss of depth from the source information resulting in subjectivity in knowledge presentation (Osorio-Forero et al., 2019). Semantic networks also has the inability to expand on knowledge beyond certain bounds (Steyvers & Tenenbaum, 2005).

During interview sessions in this study, dialogue was applied to produce shared knowledge between the researcher and participants to reduce subjectivity (Rodrigues & Pietrocola, 2020). The approach helped in developing simple semantic networks around three central domains of: 1) Conservation Objectives,

2) Risk Management and 3) Sustainable Economic Opportunities. The researcher applied his socio-ecological perspectives to interview responses from nine CREMA leaders to develop the semantic networks. This exploratory research sought to develop shared knowledge (Rodrigues & Pietrocola, 2020) to understand and appreciate the interrelations among conservation factors that occur on the CREMA landscape.

The author of this study is an employee of the Wildlife Division of the Forestry Commission of Ghana where he has been involved in the establishment of CREMAs. This paper is generated from his doctoral dissertation where he applied qualitative phenomenological approach to study CREMA leaders' ecological worldviews and their impacts on nature conservation risk assessment. Dialogue was used during qualitative interviews to reduce possible biases from both the participants and the researcher and to bring out shared meaning. The researcher accepts community nature conservation programmes bring out positive outcomes by reducing the degradation of resources. He also believes local people can improve their livelihoods through effective resource management participation than the centralized government system that alienate them from benefits and control. Nonetheless, there are complexities in establishing and managing biodiversity resources in community conservation programmes like CREMAs. His experience shows CREMAs generally suffer from ineffective management which negatively affect sustainable conservation of the resources in the communal lands. It is noteworthy to state that this study does not constitute an official assessment of the studied sites by the researcher's employers.

Methodology

Study areas

Three CREMAs situated in the northern savanna zone of Ghana were selected for this study. The three study sites are Sayinga-Kasena-Gavara-Kara (SKGK), Wechiau Community Hippopotamus Sanctuary (WCHS) and Zukpiri Integrated Wildlife Sanctuary (ZIWS). Although the sites have differences in their establishment origins and the number of years they have existed as autonomous CREMAs, they also have similar nature conservation issues. The three sites are located in a comparable ecological landscape in the northern savanna zone of Ghana. Their similarities and differences provided opportunities to identify major issues that affect CREMA establishment and management. For example, issues of annual bushfires, poaching and illegal logging are reported within the selected sites. Also, the people of the study sites heavily rely on subsistence agriculture and collection of Non-Timber Forest Products (NTFPs) like Shea nuts, African Locust Bean and hunting of game to make a living.

Research Paradigm

The study was exploratory; aimed to understand and appreciate the socio-ecological issues of the CREMAs based on the lived experiences of interview participants. Descriptive qualitative phenomenological approach was used to allow the researcher and the participants to cross beyond themselves and into universal views (Groenewald, 2004) to create new insights. The application of phenomenological approach was to bring out lived experiences, consciousness and essences of the CREMA leaders' socio-ecological ideas (Sloan & Bowe, 2014). According to Finlay (2009) and Kafla (2011) phenomenological studies allow researchers and participants to stretch their understanding beyond the phenomenon under study to bring new perspectives on a subject. Nine CREMA leaders were interviewed to bring out their appreciation of the interrelation that exist among socio-ecological issues of the CREMAs.

A separate one on one interviews were conducted in the evenings after field visits to the CREMAs. The researcher visited the fields of the three conservation areas in the mornings to observe some conservation activities undertaken in the CREMAs. The field visits were used to shape up the approach to interviews. Dialogue was applied during interview sessions to produce shared knowledge between the researcher and participants to reduce subjectivity (Rodrigues & Pietrocola, 2020). This allowed for constructing

simple semantic networks around the three central domains of: 1) Conservation Objectives, 2) Risk Management and 3) Sustainable Economic Opportunities. The researcher allied his socio-ecological perspectives to interview responses from the nine CREMA leaders to develop the semantic networks.

Selecting participants for interviews

Three participants were selected from each of the three CREMAs for face-to-face interviews. The top management executives were purposively selected to fulfil the study's purpose to understand and appreciate the socio-ecological factors that influence CREMA management effectiveness as has been experienced by the leaders. The selected participants were well informed with CREMA leadership experiences having served as key implementers of nature conservation and socio-economic livelihood strategies for a number of years. Their leadership experiences ranged from five to 18 years. CREMA leadership is largely voluntary, the participants have had other engagements in their communities which made them suitable candidates to expatiate on nature conservation and socio-economic development. For example, five of the participants were members of their local District Assemblies whereas another was a chief of his community.

Boyd (2001) and also Creswell (1998) stated for phenomenological studies, selecting between two to 10 participants is enough to reach saturation point where no new significant data is generated from adding more participants. Thus, selecting nine participants from three different CREMAs expanded the study's scope which was important to ensure rigor and credibility.

Ethical issues of the study

The study design was approved by the Dissertation Review Board (SMC University Prospectus Review, 3/10/2017) of Swiss Management Center University. There was also no known legal barriers to undertaking this study. The researcher applied proper ethics (Laverty, 2003) in selecting and interviewing participants. Letters were written to the management executives of the SKGK, WCHS and ZIWS about the study. The executives were contacted via telephone and emails to determine their preparedness to take part in the interviews on the agreed date after the letters were sent. All the nine targeted participants agreed to participate and each was given a copy of a signed consent form on the day of interview. One of the respondent was not literate in the English Language, thus the consent form was read to him in the Twi Language (the language understand by both the researcher and this participant). Participants were told the study was for academic and practical purposes only and they had the choice to decline to be part at any point they feel to do so.

Data Collection

Separate face-to-face interviews were framed with a dialogue approach around the three central domains of conservation objectives, risk management and sustainable economic opportunities (Brooks et al., 2013; Game et al., 2013). Participants were asked about their lived experiences relating to major natural resources that existed in their CREMAs which has informed their conservation objectives, conservation threats and management activities. They were then asked to mention how their experiences have informed some socio-economic opportunities they have created to promote conservation objectives and reduce threats. Probing questions were asked to clarify issues. The researcher stated his understanding of the issues and their possible interrelatedness on socio-ecological landscape of the CREMAs to the participants at stages of the conversation. This approach enabled him to create a shared knowledge between himself and the participants. This follows Rodrigues & Pietrocola's (2020) assertion that shared knowledge could be developed through combine experiences between professionals and related key actors in an organization. Nature conservation and socio-economic issues identified and agreed on during interviews were used to develop semantic networks around the three central domains.

Interviews were video recorded after the researcher sought permission from participants (Downing, 2008). The essences from the non-verbal communication captured on video and the transcripts from the

interviews helped in the data analysis especially in helping to logically piecing together the semantic interrelationships. An assistant took the video recordings which allowed the researcher to concentrate on the interviews and also to take notes on salient points. The application of dialogue enabled the researcher and participants to move attention from the camera to concentrate on the interviews.

Semantic linkages applied in the study

Themes were developed from the nature conservation and socio-economic issues identified from interviews. The themes served as labeled nodes and they were linked to each other or to the central domains by seven labeled links. The labeled links were generated from shared meanings agreed between participants and the researcher. Table 1 provides the labeled links and their shared meanings.

Table 1.

Semantic linkages derived from interviews and their explanations

Labeled links	Interrelationship explanation
1. *Is cause of*	Theme that triggers actions to be taken on a central domain.
2. *Is part of*	Theme that shares in a central domain or in another theme.
3. *Is associated with*	Central domains/themes that directly or remotely influence the attainment of each other.
4. *Is property of*	Theme of belongingness to a central domain.
5. *Produces*	Consequential outcomes derived from a central domain.
6. *Promotes*	Central domain/theme that boosts the attainment of a central domain or another theme.
7. *Contradicts*	Themes that oppose each other.

Data Analysis

Each of the nine video recorded interviews was played in a free-to-use software called *easytranscript*. The researcher transcribed verbatim the audio contents of the videos. He also translated and transcribed directly into English Language the responses of the participant who spoke in a local dialect. The nine transcripts were edited for accuracy and also for the researcher to familiarize himself with the data in a Microsoft Word document. The edited transcripts were analyzed with the assistance of Atlas.ti software (version 7.0).

A code list was deductively pre-prepared in Microsoft Word and was uploaded into Atlas.ti for analysis. The researcher applied his experiences in community conservation management and from literature Agyare, 2013, Brooks et al., 2013 and Ekpe et al., 2014) to prepare the codes. Deductive coding approach has been justified by researchers' like King (2004) because it forces researchers to include or eliminate some codes in data analysis. Both semantic and latent interpretations informed codes development in this study (Braun & Clarke, 2006). Latent codes are theorized to inform interpretive content of participants' responses whereas semantic codes portray just what was said in interviews. The researcher's intent was to develop the latent interrelationships of conservation issues of the CREMAs in semantic networks.

Themes were also deductively developed (King, 2004). To reduce arbitrariness and subjectivity, standards were set in developing themes which were in line with Osorio-Forero et al.'s (2019) assertion on mathematical graph applications which is akin to techniques used in qualitative semantic networks. Computer supported applications for qualitative semantic networks has been developed on the basis of

mathematical applications in graph theory models (Conte et al., 2012 cited in Osorio-Forero et al.'s (2019). For example, graphs have two parts represented by sets of integers which are knitted together by edges. The integers and the edges respectively are similar to labeled nodes and labeled links found in semantic networks. Osorio-Forero et al. (2019) acknowledged expert subjectivity exist in developing morphological features of semantic networks in the context of language and cognitive research, yet, the use of graph theory could reduce arbitrariness. Again for example, Ferrer i Cancho & Solé, (2001) developed semantic networks from mathematical graphs based on word frequency in a qualitative interview. Similar principles were used to develop themes from codes based on percentages a code was attached to similar quotations from the nine transcripts. This process was facilitated by the codes-primary-documents-table facility found in Atlas.ti software.

In this study, a code was given thematic status if it was tagged to at least similar quotations from six transcripts (66.7%) out of the nine. However, other themes were formed from related codes which were tagged with different quotations but did not meet the threshold set above. For example, related codes that were attached to similar quotations from four (44.4%) or five (55.6%) transcripts out of the nine were merged to form a theme. Again, related codes that were tagged to similar quotations from three (33.3%) and another three (33.3%) or three (33.3%) and four (44.4%) or three (33.3%) and five (55.6%) transcripts out of the nine were combined to form a theme. There were no codes that were attached to two similar quotations or to only one quotation for consideration. For example, 'economic activities' was merged with 'green economy' to form a new theme called 'alternative livelihood' whereas waterbody conservation emerged from river conservation and water provision. The application of percentages brought consistency and clarity to the process of holding and merging codes into themes (Braun & Clarke, 2006).

Trail of activities and participants' confidentiality

The researcher took note of his trail of activities in data collection, analysis and results presentation to ensure transparency, rigor and credibility to the study. Separate face to face interviews were conducted in the offices of each CREMA after morning field visits to CREMA sites. Interview sessions with an individual lasted between 45 minutes and one and half hours. Probing questions were asked for participants to clarify issues. The researcher stated his understanding of the issues and their possible semantic linkages at stages of the conversation to create a shared knowledge between himself and participants.

Participants' privacy has been protected by labeling their statements at the results section. The labels used were A1, A2 and A3 for participants from WCHS, B1, B2 and B3 were from ZIWS and C1, C2 and C3 were from SKGK. Labeling was done not in any particular order or through any attributions that relate to participants' positions in the CREMAs.

Results

Nature Conservation and Socio-Economic Development Issues in CREMAs

Presentation of findings begins with theme development. The next section is on themes and their description derived from shared understanding from interviews. The central domains and their semantic linkages follow. The interrelatedness of identified themes with their central domains are then discussed. Participants' statements have been presented to support how themes were developed and such quotations have been *italicized*. Also, semantic linkages have been presented in *italicized* format in the write up.

Theme development and their semantic linkages

CREMAs are established through consultations with key stakeholders where conservation baseline data is collected to provide information on unique resources found on the landscape and how unsustainable exploitation threatens the resources. Thus, conservation baseline data and unsustainable nature

exploitation are two major *causal* themes for CREMA establishment. The two *causal* themes also form *parts* of activities applied to manage conservation risks leading to the development of sensitization and law enforcement strategies.

Participant's statement below depicts how *causal* themes lead to CREMA establishment. Themes like nature conservation, unsustainable nature exploitation, conservation baseline data and conservation motivation were developed from this and similar quotations.

> C1: *…the natural resources like plants and animals or the environment was fast depleting and it seemed not to be under anybody's cares… The involvement of the communities has helped…Surveys were conducted…we realized the resources were common for everybody and we were using them without taking into considerations any sustainability plan. That is what brought us to the establishment of the SKGK CREMA.*

CREMA establishment purpose is to manage unsustainable exploitation of resources. The above statement shows CREMAs are established after surveys have been conducted to collect credible data on available resources and threats that militate against its sustainability. Good data enables effective conservation objectives to be set up to manage pressures that threaten the resources sustainability.

Sustainable socio-economic opportunities initiated in the CREMAs provided the basis for developing themes like agency facilitation, alternative livelihood, sustainable NTFPs collection, tourism development and gender considerations meant to empower women. These programmes are purposively initiated to win community members' support.

> *B1: There was a meeting with a new NGO (Non-Governmental Organization) today and they are intending to assist us in agriculture and also help our women to process Shea nuts into butter. They are also bringing buyers to buy Dawadawa* (African Locust Bean). *They have just come and we are yet to start.*

> B3: *'Environmental Protection Agency of Ghana rushed in and introduced us to UNDP (United Nations Development Programme)/GEF (Global Environmental Facility) small grant project for support when we started. Ghana Tourism Authority also came in to support us on our tourism development plan'.*

Nature conservation projects in the CREMAs require external agencies facilitation to *promote* conservation ideals and socio-economic development goals to achieve sustainable benefits. B1 and B3 statements above and similar ones from the transcripts show how external agencies (both governmental and non-governmental) provide socio-economic opportunities for the CREMAs. Sustainable utilization programmes are designed for non-timber-forest-products to economically empower the people. Women economic empowerment is the main gender consideration particularly promoted in alternative livelihood programmes.

Themes like conservation motivation, sustainable benefits and change in attitude were developed from participants' responses to questions related to conservation objectives. Conservation motivation comprises the incentives that *cause* the CREMA leaders to lead their people with conservation objectives which are aimed to achieve sustainable benefits. The sustainable benefits consists of the dual outcomes of viable nature conservation and sustainable socio-economic development.

> A1:*…besides the plants and animal conservation, we also think about the cultural and economic motivation linkages…You know in the project we look for sustainability. If this generation is not there, other people have to take over and they have to get some knowledge. So the WCHS has built schools. We have two schools so far at vantage points so that children from two or three communities can attend. We have provided scholarships to about 40 students at the tertiary level (*i.e. after high school*).*

CREMAs establishment motivation are generally placed on conservation objectives that seek to protect plant and animal resources. Successes achieved in nature conservation in the CREMAs becomes pivotal

to attract socio-economic development projects. A1's statement above shows how by focusing on plants and animals conservation, other benefits like education infrastructure has been built for some communities.

A change in attitude that *promotes* a sense of communal ownership of the resources is the level of cooperation the CREMA leaders expect from community members. A major change in attitude mentioned by all the nine participants is themed 'peer risk management'; where community members foil illegal and unsustainable activities of other community members. To the participants, it was a measure of nature conservation success as it *part* in risk management. A2 made the statement below to depict how positive change in attitude of community members form *parts* in law enforcement.

> *…there was a time that some people wanted to fell a tree, I got a call and we moved in to stop them. Also you can see the change when a community member can question others for example why are you carrying a gun into your farm? ...people in the community will stop you or they will call the Sanctuary authorities when they found you out… Even when I am going around and small children see me, they hide their catapults* (slingshots).

CREMA members are expected to shift their views on the resources from the commons to a sense of ownership that *promote* communal benefits. For community members to report others or confront them for inappropriate use of the resources result from constant conservation sensitization, awareness creation and enforcing laws. The indication that even children within the CREMAs to understand the implications of illegal hunting, thereby resorting to hide their slingshots from authorities is a testament to change in attitude.

Identified socio-ecological themes of the CREMAS and their explanations

Seventeen different themes were developed under the three central domains. Conservation objectives had nine themes, risk management had eight themes and sustainable economic opportunities, 11 themes. Ten of the themes were exclusive to a particular central domain. However, unsustainable nature exploitation, sustainable benefits, conservation motivation and alternative livelihood were crosscutting themes appearing under all the central domains. Law enforcement, conservation sensitization and agency facilitation fell under at least two domains. The 17 themes, their descriptions and their related semantic linkages are shown in Table 2. Empty cell shows that themes is not valid under that domain.

Table 2.

Themes description and their semantic linkages to the Central Domains

Themes	Themes Description	Conservation Objective	Risk Management	Sustainable Economic Opportunities
Agency facilitation	Governmental and non-governmental agencies that facilitate socio-ecological activities in the CREMAs.	*Promotes*		*Promotes*
Alternative livelihood	Supportive programmes initiated to promote nature conservation and to improve living standards of members.	*Promotes*	*Promotes*	*Is property of*
Change in attitude	Changes that occur in community members' perception and behaviour to accept nature conservation.		*Is part of*	
Conservation baseline data	Status of unique flora and fauna species including their socio-economic importance in the CREMAs.	*Is cause of*		

Conservation motivation	The incentive to conserve an ecosystem or flora or fauna species because of their utility and amenity values.	*Is cause of*	*Promotes*	*Promotes*
Conservation sensitization	Educational and nature conservation awareness programmes carried out to make people understand conservation issues.		*Is part of*	*Promotes*
Cultural conservation	The importance attached to the conservation of nature because they have inherent cultural values to the people.	*Is part of*		
Gender considerations	Socio-economic opportunities created on gender considerations with emphasis to support women.			*Is part of*
Law enforcement	All regulations and restrictions used to curb illegal and unsustainable nature conservation threats.		*Is part of*	*Promotes*
Nature conservation	Unique flora and fauna species conserved in the CREMAs.	*Is part of*		
Peer risk management	Community members foiling illegal activities of others to reduce or eliminate nature conservation threats.		*Is part of*	
Sustainable agriculture production	Agriculture programmes that integrate quality inputs supply and soil fertility interventions with livestock rearing to improve farmers' living conditions.			*Is part of*
Sustainable benefits	All socio-ecological benefits sustainably derived from the CREMAs; including their allocation to beneficiaries.	*Produces*	*Produces*	*Produces*
Sustainable NTFPs collection	Sustainable collection and processing of NTFPs to improve CREMA members' living conditions.			*Is part of*
Tourism development	Eco-tourism activities initiated to generate sustainable alternative income for CREMA members.			*Is part of*
Unsustainable nature exploitation	All socio-economic utilization activities of nature that unsustainably degrade the resources base.	*Is cause of*	*Is cause of*	*Is cause of*
Waterbody conservation	The importance attached to the conservation of waterbodies because of its utility and amenity values.	*Is part of*		

Definitions applied to the central domains in this study

The focus of all the three CREMAs was first to protect the natural resources and then leverage on that to promote the peoples' living conditions. The key focal resources are the plants, animals and water as

well as cultural resources of the landscape. There were no major differences in participants' responses on conservation objectives, risk management and socio-economic opportunities approaches.

The following are the shared meanings derived from interviews to define the three central domains. *Conservation objective*: The purposes of setting up CREMAs to promote nature conservation and to improve living standards of community members. *Risk management*: Mechanisms use to reduce or eliminate nature conservation threats in the CREMAs. *Sustainable economic opportunities*: The application of sustainable mechanisms to exploit natural resources to improve living standards of members.

Semantic interrelationships of labelled links to the central domains

Figure 1 is a semantic interrelationships developed from participants' responses for the three central domains. Statements below and similar ones show how the semantic linkages among conservation objectives, risk management and sustainable economic opportunities relatedness were derived.

> *A1: The objective of the project is to conserve plants and animals…we are also looking to lifting up the culture of the people. Again one of the objectives is to protect the water bodies by reducing threats against the resources and promote their linkages or influences on the tourism potentials and other sustainable development potentials of the area.*

> C1: *The objectives are to protect the CREMA resources and to raise the living standards of the citizens living in the various communities. For example through the CREMA we have alternative livelihood support for members in beekeeping and Shea nuts processing.*

The core objectives of the CREMAs were to protect natural resources by managing risks that threaten the resources. The leaders then leverage on their conservation success to promote alternative livelihoods to improve living standards of members. From figure 1, conservation objective *promotes* sustainable economic opportunities. However, the attainment of sustainable economic opportunities *is associated with* how the risks that threaten the resources are managed. Risk management importance in the CREMAs rests on its direct or remote *associations with* the other two central domains. A1 and C1 views indicated above show the CREMAs strive to manage threats by reducing illegal and unsustainable utilization practices to attain conservation objectives that *promote* sustainable economic opportunities.

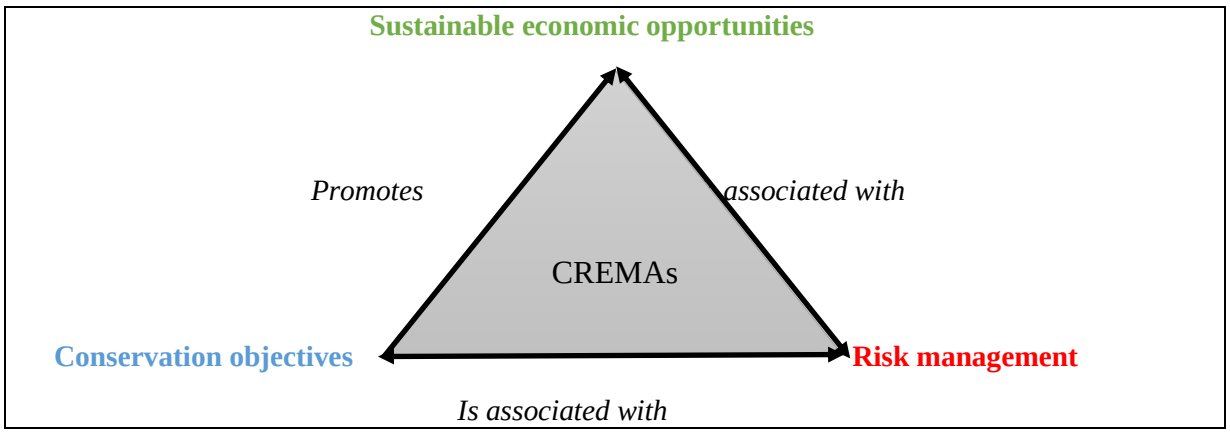

Figure 1. Semantic interrelationship among the three central domains

CREMA Conservation Objective and Its Themes Interrelationships

Conservation baseline data, nature conservation, waterbody conservation and cultural conservation were exclusive to conservation objective domain. CREMA objectives are promoted to achieve nature conservation principles that also improve living standards of community members. The conservation objectives of the WCHS, ZIWS and SKGK did not vary much as the major purpose was to conserve

unique flora and fauna species that occur on their communal lands and to leverage on them for socio-economic development.

Semantic interrelationships of conservation objective themes

The CREMA conservation objectives have both ecological and socio-economic themes. Unique flora and fauna resources found on the communal landscape are *associated with* abiotic resources like waterbodies and the cultural heritage of the people which together form *parts of* the objectives. See B3 and C3 statements.

> *C 3: The first objective is the conservation of the animals and plants… because where there are animals, the land is always fertile for farming activities… we do not only talk about animals; it is also about rivers or water, culture…The conservation of wildlife will bring the other economic benefits.*
>
> *B 3: The main objective is just to preserve the area. We want to protect both wild animals and plants. Also, we want to conserve the Black Volta which is an international River for Ghana and Burkina Faso…locally the fish and the River has cultural significance*.

The above statements and similar ones indicate the core objective of nature conservation is also *associated* with the culture of the people and waterbodies of the landscape.

The main *causal* themes that prompt the setting up of CREMAs are conservation baseline data, unsustainable nature exploitation and conservation motivation. The three *causal* themes give credence to the basis of establishing CREMAs. For example, C1 captured these essences. *'… the plants and animals or the environment was fast depleting…Surveys were conducted…. That is what brought us to the establishment of the SKGK …'.* Resources degradation is the main *cause* that prompt surveys to be conducted to get baseline data. The leaders use the established basis to formulate conservation objectives aim to *produce* sustainable benefits. Figure 2 shows conservation objectives and its themes placed logically to each other in a semantic interrelations.

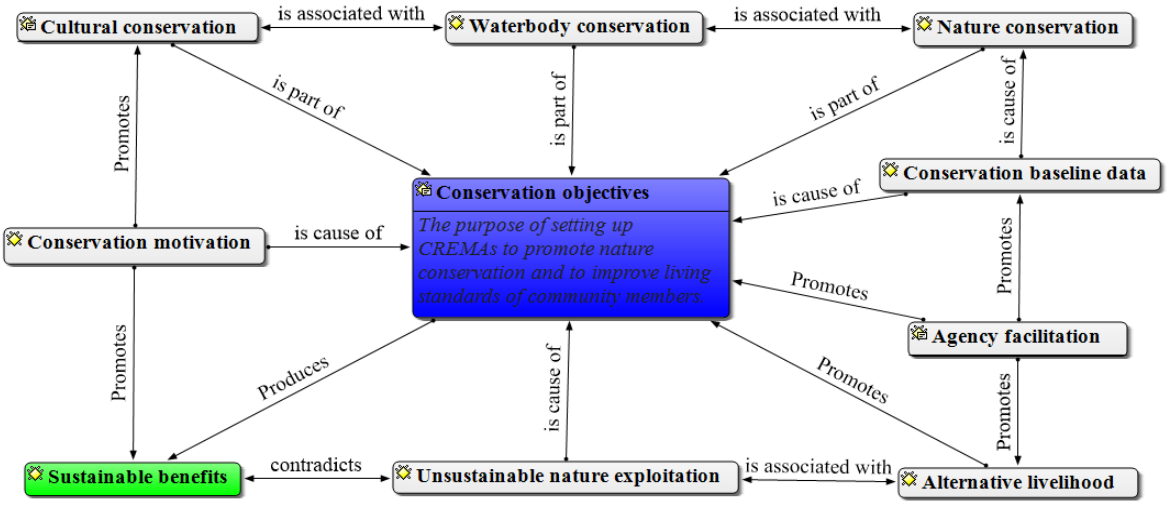

Figure 2. Conservation objective thematic interrelationships

There are themes like agency facilitation and alternative livelihood that *promote* the attainment of the CREMA objectives. External agencies mainly facilitate the initiation of socio-economic opportunities in the CREMAs. B 3's statement below shows the CREMAs tap into external agencies' support to promote socio-economic opportunities.

> *…we have realized we have tourism potential. We have the hippos,.. I have already written to the District Assembly to help tap our development potential. The Member of Parliament of the area has a copy and the UNDP/GEF programme also has a copy of our proposal*.

Risk Management and Its Themes' Interrelationships

Risk management are the mechanisms used to reduce or eliminate major conservation threats such as poaching, bushfires, illegal logging, and unsustainable agriculture in the CREMAs. Out of the eight themes that fell under this central domain, peer risk management and change in attitude were exclusive.

Semantic interrelationships of risk management themes

Figure 3 shows the semantic interrelationships of socio-ecological themes of the CREMAs.

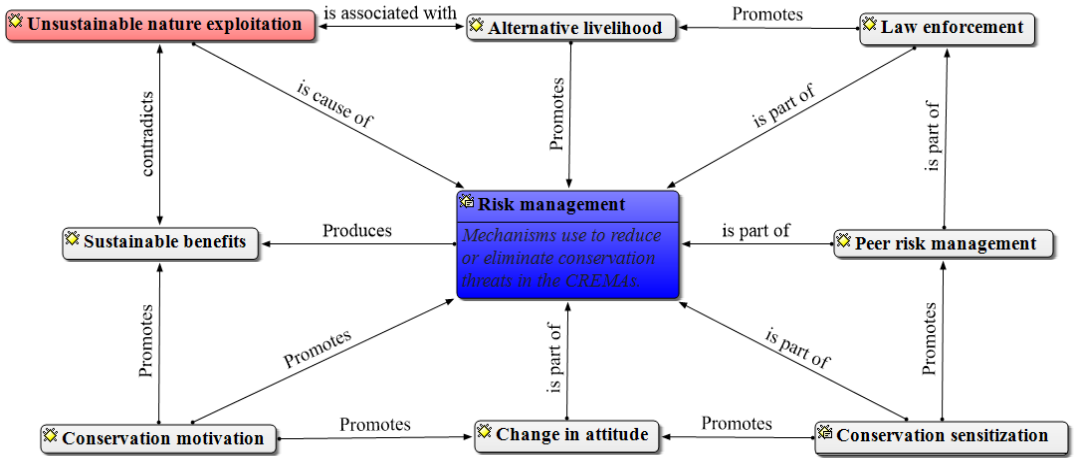

Figure 3: Risk management thematic interrelationships

The basis for risk management programmes in the CREMAs is to reduce illegal activities. The main *causal* theme under this domain is unsustainable nature exploitation. For example, A 2 mentioned; '*If it happens, I will stop my work and I believe most of the workers will stop too. That could be disastrous to our conservation objectives'*. The participant asserted to stop his work if the hippopotamus is poached; this is an indication to the conservation motivation for the species and also how its unsustainable utilization will *cause* the collapse of the conservation project.

Risk management is *promoted* by conservation motivation and alternative livelihood whereas change in attitude, law enforcement, conservation sensitization and peer risk management form *parts* of risk management activities in the semantic network.

A change to create a new sense of communal ownership and for community members to incorporate nature conservation as a legitimate land use in their farming activities *form* part of risk management. The main themes that *promote* change in attitude are conservation sensitization and conservation motivation. For example, C 2 stated: '*In the past you would see about five or six people will just come from somewhere on motorbikes and they joined those around to go hunting… It is not happening as it used to be since the CREMA was established'.* This statement infers the level of poaching has reduced from the previous levels.

Sustainable Economic Opportunities and Themes

Sustainable mechanisms are applied to exploit the natural and cultural resources of the CREMAs for socio-economic development. Sustainable economic opportunities had 11 themes and four were exclusive to the central domain. The exclusive themes were sustainable NTFPs collection, gender considerations, sustainable agriculture production and tourism development.

Semantic interrelationships of sustainable economic opportunities themes

Just as it is under risk management, unsustainable nature exploitation is the main *causal* theme under sustainable economic opportunities. That is, the aim to establishing viable nature based businesses is to *contradict* unsustainable nature exploitation practices. However, under sustainable economic

opportunities domain, alternative livelihood theme *is property of* the domain unlike under conservation objectives and risk management where it *promotes*. For example, B3 mentioned some alternative livelihood programmes that serve as sustainable economic opportunities created in ZIWS.

> *We also have small ruminants project with 48 people involved. We have beekeeping established for 40 people… We have a fast growing cassava plant supplied from Ministry of Food and Agriculture to selected farmers. The Gari-Tapioca women group process the cassava into gari (*local staple*). We also have batik-tie-dye group who make clothing for sale. We are again developing our tourism plan around the hippopotamus.*

Tourism development, sustainable agriculture production, gender considerations and sustainable NTFPs collection themes' strategies are initiated to form *parts of* sustainable economic opportunities. These programmes are pursued as major nature conservation and socio-economic development options. For example, gender considerations are enshrined in the constitutions with affirmative clauses to ensure women participation in CREMA activities with emphasis to promote their greater economic empowerment.

The rest of the themes under sustainable economic opportunities *promote* the attainment of the central domain and their connected themes. However, tourism development and sustainable agriculture *associates with* each other. That is, both sets of themes directly or remotely influence the successes of each other. For example, the number of tourists' visitations will have an impact on the kind and level of sales of food packages in the CREMA communities. In the same way, a successful implementation of eco-tourism activities would create new businesses and other job opportunities that could affect the number of people who would be engaged in agriculture. A 1's statement attest to this assertion.

> *… We have the tourism aspects which I will say is now fueling the conservation project. The money we get from tourism is used to protect the area. Through that we have employed staff such as rangers who are working for us to make sure human activities do not interfere….*

Noticeably, some community members are employed to be tour guards and rangers to respectively guide tourists and protect the conservation area against activities that are detrimental to the eco-tourism. The new employment and eco-tourism business opportunities limit the number of people who could have been farmers and also restrict areas that could have been put under cultivation; indicating the *associative* relationship between agriculture and eco-tourism. Figure 4 is the semantic networks for sustainable economic opportunities in the CREMAs.

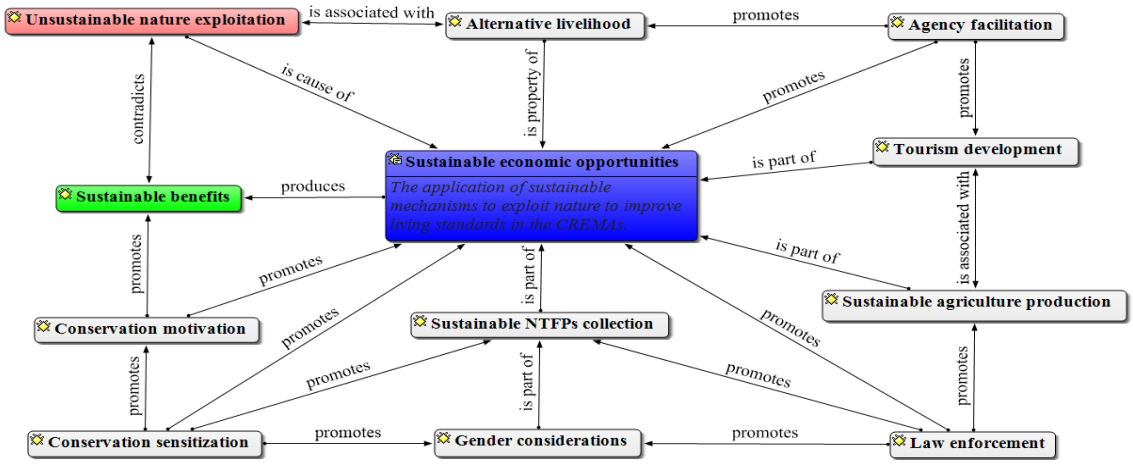

Figure 4. Sustainable economic opportunities thematic interrelationships

External agencies are really important in developing sustainable economic opportunities in the CREMAs. These agencies provide, for example, capital and machinery for processing NTFPs and they also support the communities to regenerate degraded lands or linked them to private sector investments to develop other businesses. Both governmental and non-governmental agencies *promote* sustainable

socio-economic opportunities by providing both technical and financial supports. See C 1 statement. '*With a help from the Wildlife Division, our communities have put up their Shea nut processing plants; it is left with Katiu and Kayoro although the machines have been brought'.*

Discussion and Conclusion

This study identified the CREMA landscape to have both ecological and social themes with intricate interrelationships that implementers have to understand. First, there are *causal* themes that prompt CREMA conservation activities. Nature conservation threats (Game et al., 2013) emanate from unsustainable exploitation which is the major *causal* theme, because it *contradicts* the determinations of sustainable benefits that are expected to be *produced* from implementing CREMA activities.

However, the ability to initiate successful nature conservation programmes that yield sustainable benefits depend on quality conservation baseline data that connect to the socio-economic demands of the people on the resources. To avoid collaborative nature conservation pitfalls (Agrawal & Gibson, 1999; Shafer, 2015), surveys are thus conducted first to understand the status and nature of utilization dynamic potentials to improve livelihoods (Bixler et al., 2015; Brooks et al., 2013). Such surveys are expensive to undertake and usually external agency facilitation is needed to collect quality data for CREMA establishment and its effective management.

There are also themes that form *parts* of the central domains (conservation objectives, risk management and sustainable economic opportunities) and some other related themes. An understanding of the interrelationships that exist among the themes that form *parts* of the three central domains and their related themes can better explain the socio-ecological functions (Agrawal & Gibson, 1999) of the resources. For example, the flora, fauna, waterbody and cultural resources of the CREMAs form *parts* of the conservation objectives and it is on the basis of their socio-ecological status and functions that alternative livelihood programmes which are aimed to bring effectiveness and efficiency to their utilization are initiated (Brooks et al., 2013). Some programmes like sustainable NTFPs collection, sustainable agriculture production, gender considerations and tourism development are initiated to form *parts* of sustainable economic opportunities. Implementing such programmes is contingent on available natural resources of the CREMA. However, the sustainable benefits to be derived will not thrive only on effective risk management strategies, but also on measures that encourage their just and fair allocation to the people (Agyare, 2013).

Five themes *promote* the achievement of the central domains. These encouraging themes; agency facilitation, alternative livelihood, conservation motivation, conservation sensitization and law enforcement are also crosscutting, transcending beyond one central domain. Apart from their encouraging roles in the achievement of the central domains, these themes also, under some interrelationships, encourage the achievement of other themes or they themselves are *promoted* by related themes. For example, alternative livelihood under risk management domain *promotes*, but the same theme is *promoted* by agency facilitation under conservation objective and sustainable economic opportunities. These intricate interrelationships among conservation themes to their central domains bring to the fore Lockwood et al. (2010) warning to the nature conservationists to consider addressing conservation issues at both temporal and spatial scales.

Ideas on how to achieve conservation objectives differ on the communal landscape. Shafer (2015) for example advocated for sole application of strict law enforcement whereas Geldmann et al. (2019) advised livelihood improvement programmes be combined with law enforcement. The findings of this study confirm an application of placating themes like livelihood incentives and creating awareness together with sanctions are the effective mechanisms to achieve sustainable benefits in the CREMAs.

The *promoting* themes interrelationships to both nature conservation objectives and socio-economic opportunities bring further understanding to CREMA establishment and management. For example, the CREMA leaders actively seek external agencies support to establish and implement CREMA programmes (Owusu-Ansah, 2020). Again, to secure the resource base upon which the alternative livelihood strategies are built, conservation sensitization and law enforcement strategies (Shafer, 2015)

which *promote* change in the local peoples' attitudes are initiated. The effectiveness of conservation sensitization and law enforcement strategies thrive on an understanding and appreciation of the *contradictory* effects that unsustainable exploitation have on the expected sustainable benefits to be *produced* from the CREMAs.

Additionally, law enforcement and conservation sensitization strategies *promote* sustainable economic opportunities unlike under risk management where they form *parts* of the central domain. Therefore these strategies are not only initiated to reduce or eliminate threats that degrade the resources, but also to change attitudes to secure the resource base of rural enterprises. Peer risk management was noticeably mentioned by all participants as an important indicator to effective risk management. The communities in the study sites can be characterized as having cultures of collectivism and masculinity; with a great power distance between males and females (Hofstede, 2001). The reported changes in attitudes and behaviours in the CREMAs is worth mentioning. That is, implementing CREMA activities have allowed members to now challenge unsustainable practices of others based on the expected equal and equitable collective shared benefits to members.

Gender considerations are mostly reserved for women's economic empowerment in the sustainable economic opportunities programmes. They are initiated to reduce the economic power distance relation between males and females (Hofstede, 2001). The economic power distance between males and females in the study sites is manifested in the control and access rights to natural resources; where women are disadvantaged (Laube, 2015). Ironically, women form the majority who depend on NTFPs collection and processing for livelihoods (Moore, 2008). Thus, affirmative clauses are enacted into CREMA constitutions to deliberately promote programmes that encourage women active participation in CREMA activities.

Conclusively, there are important intricate socio-ecological issues in the CREMA landscape which must be managed effectively to achieve conservation strategies planned to protect the landscape resources and also to promote rural livelihoods. The challenge to the CREMA managers is how to balance the application of both incentives and restrictive programmes (Bandoh, 2010) to fairly share sustainable benefits to members to avoid the disenchantments that occur in collaborative nature conservation (Agrawal & Gibson, 1999).

Study limitations

The study was undertaken in only three CREMAs and therefore interpretation and application of the findings to broader community conservation projects should be done with caution. Again, the findings were influenced by the experiences of the researcher in collaborative nature conservation. His experiences and those of the participants' influenced the shared meanings used to develop the semantic networks in line with Osorio-Forero et al.'s (2019) which admit experts' subjectivity in semantic networks development.

Recommendations

This study considers conservation education, law enforcement and livelihood programmes should be combined to effectively manage CREMAs unlike in the government protected areas where little livelihood incentives are provided. CREMA leaders should carefully incorporate law enforcement, conservation education with livelihood incentives to achieve sustainable nature conservation objectives.

CREMA managers have to work assiduously to change the local people attitudes towards the resources from the commons to a sense of communal ownership to promote effective risk management. 'Peer risk management' where community members challenge the unsustainable activities of others is the revolutionized attitudinal change on natural resources that managers should target in the CREMAs.

CREMA programmes that seek to promote economic empowerment of women should be pursued with finesse even as they aim to reduce economic power distance between males and females. That is to remove some cultural barriers that control women access to natural resources.

The findings of this study should be explored further because the CREMA model has the potential to enhance socio-economic opportunities to improve livelihoods of rural people by managing risks that threaten natural resource sustainability.

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Ethical approval

In the writing process of the study titled "**Applying socio-ecological perspectives semantic networks in managing community conservation areas in Ghana**", the rules of scientific, ethical and citation were followed; it was undertaken by the authors of this study that no falsification was made on the collected data, "Journal Action Qualitative & Mixed Methods Research [JAQMER] and Editor" had no responsibility for all ethical violations to be faced, and all responsibility belongs to the authors and that the study was not submitted for evaluation to any other academic publishing environment.

Ethics committee approval

The study design was approved by the Dissertation Review Board (SMC University Prospectus Review, 3/10/2017) of Swiss Management Center University.

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Exploring the potential of play-based learning interventions for academic success: An action research project on improving preschool students' number mastery

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Abstract. This action research project aimed to improve preschool students' number fluency through a six-week play-based learning intervention. The study collected data from students' GOLD assessment checkpoints and weekly formative assessments. The results showed a significant increase in students' number mastery (1-10 counting) from 40% to 60%, with even higher progress for those going into kindergarten on counting 1-20. The findings suggest that students of all backgrounds, including Special Education and ELL students, can achieve academic success with the right learning environment. The study highlights the potential of play-based learning interventions for enhancing early childhood education.

Keywords: Play-based learning, number fluency, number mastery, preschool

Introduction

The development of number fluency, which refers to the ability to understand and manipulate numbers effortlessly, is widely recognized as a pivotal aspect of early childhood education (Dehaene, 2011). It serves as a fundamental building block upon which various mathematical concepts and skills are constructed, thus laying the groundwork for future academic accomplishments. This significance is magnified in the context of rural public schools, where resource constraints often present challenges to delivering comprehensive educational experiences. Moreover, the diverse array of learning styles and cognitive capabilities within the student population further underscores the importance of nurturing strong number fluency.

In this study, a preschool teacher, also the lead author, embarked on an individualized action research endeavor to enhance the number fluency of her young learners. This undertaking was imbued with a strategic emphasis on two key components: firstly, the adept recognition of numbers, and secondly, the proficient ability to write numbers up to 20. The rationale behind this research stemmed from the belief that a solid grasp of number recognition and writing skills at an early stage could pave the way for greater mathematical competence in subsequent years.

Extensive literature highlights the critical role of early numeracy skills in children's mathematical development. A consensus among researchers, such as Clements and Sarama (2009), indicates that early number competency serves as a foundational pillar for later mathematical achievement. Empirical

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evidence by Duncan et al. (2020) further corroborates that early numerical knowledge is a significant predictor of later mathematical success, even after controlling for other cognitive factors and background variables. This is supported by the work of Ghazali (2020), who found that children who begin elementary school with a firm understanding of numbers and their meanings are better equipped to tackle more complex mathematical concepts. Moreover, studies by Borah (2022) and Ginsburg (2021) suggest that the ability to recognize and write numbers accurately is not merely a rote skill but is indicative of a child's understanding of number concepts and place value. The approach of this action research is also rooted in Vygotsky's social constructivist theory (Vygotsky, 1978), where the scaffolding of number writing and recognition is considered as a social process that can be enhanced through interaction with more knowledgeable others.

In light of this theoretical and empirical background, the action research undertaken by the preschool teacher aims to contribute to the field by not only enhancing pedagogical practice but also by providing further evidence of the long-term benefits of early number fluency. Through methodical observation and intervention, this study seeks to bridge the gap between theory and practice, thus enriching the academic discourse with practical insights into the development of number fluency in early childhood education.

Method and paradigm of research

According to Bennett et al. (2022), action research is an investigative method in which classroom teachers assess and enhance their teaching strategies to tackle specific issues in their classrooms. This method centers on identifying a particular problem, allowing the teacher to assume the role of a researcher and devise measures based on their discoveries. It is a rigorous inquiry process that bridges the gap between theory and practice, fostering critical thinking and results-based decision-making. Walker and Vu (2023) observed that many schools in the US have recently adopted the practice of incorporating teacher action research into the evaluation process to enable educators to take charge of their professional growth while learning from their colleagues' successes and struggles in the classroom.

As action research is concerned with change and participation and emancipation, mainly three paradigms of radical structuralist, interpretive and radical humanist in guiding action research. The interpretive paradigm is based on the fact that reality is created as a result of interpersonal interaction through talking-discussion -understanding- reconciliation. This paradigm based on anti-positivism and hermeneutic/practical interest guides action researchers especially in participatory and emancipatory action research due to being participatory and democratic as practitioner is involved as partners with expertise, not as subordinates (Burrell & Morgan, 1979; Gunbayi, 2020a). Thus this action research is guided by participatory action research based on interpretive paradigm as participatory action research which aims to improve effectiveness as well as enhancing the practitioner's understanding and professional development (encouraging practitioner practical deliberation and self-reflection) (Gunbayi, 2020b) and similarly play-based learning is a child-centered approach that focuses on the child's interests, needs, and abilities, while also recognizing the importance of play in child development.

In conducting this action research, a multifaceted approach was adopted. Various instructional methods and pedagogical techniques were explored to cater to the diverse learning needs of the preschool students. Through careful observation and ongoing assessment, the teacher gauged each student's individual progress, thereby tailoring the strategies to align with their developmental trajectories. Interactive and engaging activities were designed to not only make learning enjoyable but also to stimulate cognitive growth. These activities ranged from numeral-based games and exercises to creative tasks that encouraged the integration of numbers into everyday experiences. The research was underpinned by a cyclical process of planning, action, observation, and reflection. Periodic data collection enabled the teacher to track advancements, discern trends, and refine strategies accordingly. This iterative approach empowered her to continually adapt to the evolving needs of her students, thereby fostering a dynamic and responsive learning environment. In this particular action research project, the classroom teacher aimed to help develop her preschool students' number fluency through a

play- based learning intervention. Play-based learning, often used in early childhood education settings, is a teaching approach that involves using play as a means of educating young children. It is a child-centered approach that focuses on the child's interests, needs, and abilities, while also recognizing the importance of play in child development. Play-based learning encourages children to explore, experiment, and discover new things in a fun and safe environment.

Sampling

The curriculum and intervention programs used in the classroom have primarily focused on language and literature, with math activities integrated based on what is being covered in class. The Teaching Strategies GOLD assessment tool, which monitors the progress of children in key domains of learning, has shown that math and numbers are a lower area for all of her students. According to the GOLD guidelines, preschool students should be able to identify numbers up to 10 by the time they enter kindergarten, with a goal of identifying numbers through 20 for a solid foundation going into kindergarten. However, at the February checkpoint, only 46% of her students could identify numbers up to 10. Those students who were returning for another year all struggled with identifying numbers up to 6. As a dedicated teacher, she wanted to build a solid foundation on numbers for them so that they can carry that over to next year where they can add to their knowledge base. With that in mind, she started an individual action research project to help develop her students' number fluency

Researcher characteristics

The teacher, also the lead researcher of this project, has been teaching preschool at a rural public school in the Midwest in the US for five years, with 25 students ranging from age 3-5 years old split between two classes. Some of these students are in their first year of school and others are getting ready to go to kindergarten next year. Within these two classes, 07 students receive special education services, 01 is an EL student, and 02 are behavior students. According to the teacher, her students bring a wide range of learning styles and cognitive abilities to the classroom, with a lot of differentiation happening through large group, small group, and individual support.

Intervention and data collection

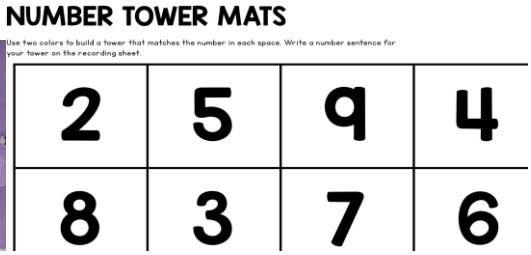
Data collected for this study included two main sources. The first source was from students' GOLD assessment checkpoint before and after the 06-week play- based learning intervention. The second source was formative assessment of students' weekly progress. At the beginning of the intervention process between both the morning and afternoon classes, the teacher had 39% of her students not able to identify numbers to 10. She started to implement these interventions a week after she had collected all of the students' data pulled from GOLD. She did small group interventions 03 times a week during center time. Midway through this 06 week intervention she did a quick individual skills check to see where the students were at and if she needed to make changes to what she was doing.

The play- based learning intervention was designed to encourage children to engage in mathematical learning through playful exploration and application of concepts in a variety of contexts. To start, in whole group learning especially during calendar time, the teacher got students to talk more about the number of the month, and numbers on the calendar. To line up for lunch, she had them come up and write a number she told them on the whiteboard. When lining up for breakfast and lunch she would write a number on their dots and tell them to find that dot to line up on. According to the teacher, adding little things into their day would benefit along with small group skills groups because children engage in spontaneous exploration and application of mathematical concepts in their daily activities and play, well before they start attending school. Moreover, their understanding of mathematics can be intricate and advanced. She also put math manipulatives into their center areas, as well as the sensory bin because research shows that young children learn best through play, so adding in math-based manipulatives and letting them explore is a great benefit for them.

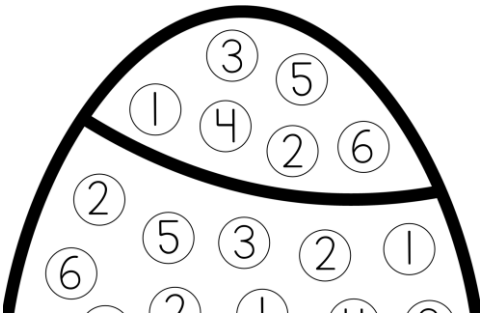
For small groups, she looked at her beginning data and split them into groups based on where they were at in GOLD. The teacher tried to pull each group 2-3 times a week depending on the needs of the students. The activities that they did within these groups range based on cognitive ability. For her lower groups they started out simple just by talking about the numbers and matching and continued to build on those skills. The higher ability groups would play dice games. She had a higher skills group that worked on writing our numbers. During this time she would not only use paper pencil but, make it more fun by using shaving cream, paint, sugar… etc. to practice writing numbers. This group was pulled 1 to 2 times a week.

During the 06-week intervention, two of the days were number identification activities. The activities were different each day, and oftentimes were repeated throughout the 06 weeks. Some of these activities included flipping a playing card and finding that number on the paper and coloring it in. Another activity was counting the number of dots on a card and identifying the number and placing a clothespin on that number. For students that needed more practice they would do activities on just matching numbers. The teacher had a few job boxes where they would match the number on a stick and place it in the hole that was labeled with that number, or just simply match the number. Below are a few examples of the interventions.

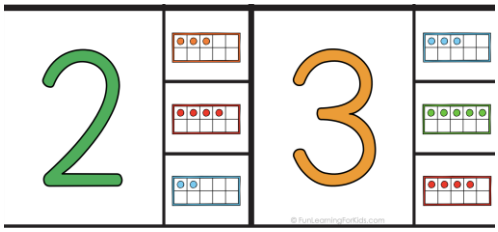
Match and say the number



Build the number with unifix cubes



Draw a playing card and color the number



One example of a number clip card

Figure 1. *A few examples of the interventions*

On fun Friday, students got to pick groups and they would play a game. A lot of her students did not play board games at home and she wanted a fun way of learning for students, not only were they working on number identification, but they also worked on turn taking, and social skills. Games that were played were, UNO, Hi Ho Cherry-O, Matching Game, and Shots and Ladders.

Ethical procedures

Scientific research ethics were followed at all stages of the research. A review board approval of the research was obtained from the University's Institutional Review Board (IRB Approval Number: 091421-1) before the project started.

Rigor

The followings were carried out to increase the rigor of our research. The study's internal validity or credibility is vigiourous, attributed to the use of the GOLD assessment checkpoints, which provided a comparative measure of student capabilities pre-and-post the six-week intervention. Additionally, the credibility is enhanced by the integration of formative assessments, offering a dynamic view of student development on a weekly basis. While these rigorous methods underpin the study's internal rigor, the external validity, or transferability, may be somewhat constrained due to the nature of action research invloving a specific educational context and demographic. However, the comprehensive documentation and transparency of the intervention steps lend themselves to potential adaptation and application in similar settings, facilitating a degree of transferability. The research's internal reliability or confirmability is exemplified by the uniformity and systematic approach in data collection, as well as the teacher's meticulous observations. The adaptability in the instructional approach, informed by ongoing assessments, illustrates a commitment to tailoring educational strategies to meet the evolving needs of students, which also supports the external reliability or dependability of the research. This structured yet flexible methodology suggests that the findings could be replicated and are dependable across similar educational scenarios, assuming similar conditions and constraints (Maxwell, 2012; Morris & Paris, 2022)

Findings

Data collected for this study included two main sources. The first source was from students' GOLD assessment checkpoint before and after the 06-week play- based learning intervention. The second source was formative assessment of students' weekly progress. At the beginning of the intervention process between both the morning and afternoon classes, the teacher had 39% of her students not able to identify numbers to 10. She started to implement these interventions a week after she had collected all of the students' data pulled from GOLD. She did small group interventions 03 times a week during center time. Midway through this 06 week intervention she did a quick individual skills check to see where the students were at and if she needed to make changes to what she was doing.

During the 06-week intervention, the teacher also collected data weekly to see the progress the students were making. She took notes on her students' progress and also kept notes on students who were still struggling, so if she needed to change up her groups she could do that. During the 06 weeks, she changed groups up twice, once 02 weeks in and then again about 02 weeks later. Once it was time for a skill check, she would pull the students individually and do a quick skills assessment using flash cards. She would then mark down on their individual student skills paper and upload that into GOLD for the checkpoint. When she updated each student's assessment paper she liked to use different colors for each checkpoint so she could compare to where they were previously.

The results showed a significant increase in number mastery (counting 1-10) from 40% to 60% after the play-based learning intervention. This increase was particularly notable for students entering kindergarten, who showed a high level of improvement in counting up to 20. Figure 2 below provides a summary of the data.

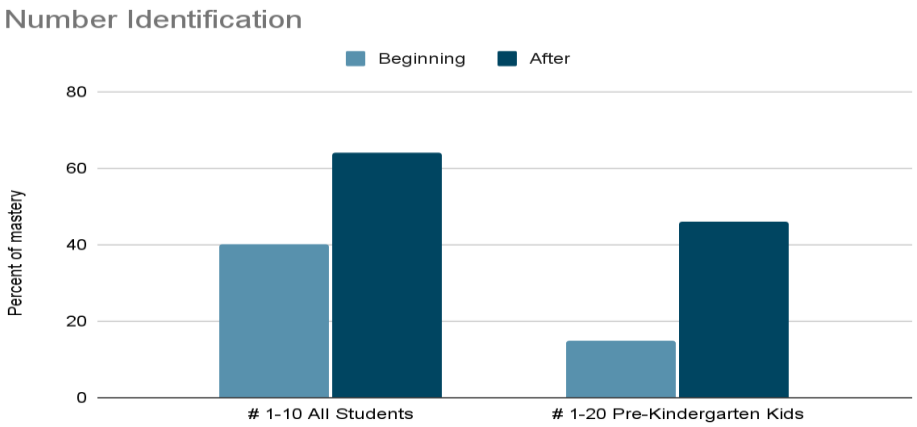


Figure 2. *Students' progress before and after the intervention*

Discussion and Reflection

According to the teacher, even before delving into the data analysis, it became evident that significant strides were being taken in the realm of skill development, even prior to conducting formal skills assessments. From observing her students in various classroom activities, the teacher stated it was apparent that their levels of confidence were steadily increasing, especially when tasked with identifying numbers within diverse contexts.

However, it was only when she conducted individual skills assessments on each student and meticulously gathered official data that she was able to gain a comprehensive understanding of the true efficacy of the interventions implemented. At the outset of the intervention process, a mere 39% of her students displayed the ability to identify numbers ranging from 1 to 10.

A closer examination of the data presented in Figure 2 underscores the remarkable transformation achieved over the course of the 06- week intervention period. The numbers speak volumes: following the completion of the intervention, a significant 64% of her students demonstrated proficiency in identifying numbers within the 1 to 10 range. This increase in success rates is a testament to the effectiveness of the intervention strategies employed.

What stands out most impressively from this progress is the notable advancements achieved by her students who are on the brink of entering kindergarten. At the initiation of the 06- week intervention period, this subgroup exhibited a mere 20% proficiency in identifying numbers up to 20. By the conclusion of the intervention, this percentage more than doubled, with an encouraging 45% of these students showcasing the ability to identify numbers up to 20.

While this may not represent a majority, it is crucial to recognize the context in which this progress was achieved. Given the baseline data from the commencement of the academic year, the strides made are undoubtedly substantial. This transformative journey highlights the power of targeted interventions and their potential to drive significant enhancements in students' skill acquisition and overall learning trajectory.

When analyzing the data pertaining to students who are slated to return for an additional year of preschool, it becomes evident that they possess a solid foundational grasp of number identification. This proficiency allows them to confidently recognize numbers up to 20 even before entering kindergarten. Given the continuity of the educational intervention, the teacher hold the conviction that their progress would continue to flourish, culminating in further advancements by the culmination of the school year—a mere 6½ weeks away.

The findings extracted from this project yield a resounding affirmation: all students possess an innate capacity for learning, irrespective of their classification as Special Education, English Language Learners (ELL), or typical learners. This assertion underscores the pivotal role played by an appropriate and conducive learning environment. Yet, amidst these encouraging outcomes, a paramount inquiry persists: how can a teacher facilitate a higher level of consistency in students who are grappling with or intermittently struggling with number identification?

The persistent challenge presents itself with three kindergarten-bound students—two duly identified as Developmentally Delayed (DD) and one categorized as having Specific Language Impairment (SLI). Despite diligently incorporating an array of interventions and daily number identification activities since the inception of the academic year, the proficiency gap remains unresolved for these three individuals. In light of this predicament, a potential avenue emerges: deconstructing the learning process into more elementary interventions. These interventions could be administered on an individual basis or within the context of a partnership with a peer possessing a heightened aptitude.

Implications

The implications derived from the findings of this action research project hold significant potential for shaping and enhancing the landscape of early childhood education in multifaceted ways:

- Effective Integration of Play-Based Learning: The study's revelation of the efficacy of play-based learning interventions in bolstering preschool students' number fluency underscores a paradigm shift in pedagogical practices. Educators should strategically embed play-based activities into their curriculum, utilizing toys, games, and interactive experiences that foster a deep understanding of mathematical concepts. This approach not only engages young learners but also establishes a strong foundation for future academic achievements.

- Empowerment through Formative Assessment: The study's emphasis on formative assessment as a tool for real-time monitoring of student progress offers educators a blueprint for cultivating personalized learning pathways. Regular assessment and timely feedback enable educators to identify students' strengths and areas needing improvement, allowing for adjustments in instruction methods. This dynamic process empowers educators to cater to each student's unique learning trajectory, leading to more substantial educational growth.

- Inclusivity and Equitable Education: The study's identification of the potential for academic success across diverse student backgrounds emphasizes the paramount importance of inclusive and equitable education. Educators are encouraged to create a classroom environment that accommodates learners with varying needs, ensuring that students with disabilities, special education requirements, or English Language Learners (ELL) receive the necessary support to thrive. This approach not only enriches the learning experience but also promotes a culture of respect and understanding among students.

- Tangible Learning through Manipulatives: The study's endorsement of the efficacy of manipulatives and hands-on materials as tools for conceptual exploration represents a reimagining of teaching methodologies. Educators are prompted to supply students with a myriad of tactile materials that foster active learning. Through tactile engagement, children can grasp abstract mathematical ideas more concretely, promoting a deeper understanding and retention of concepts.

- Customized Learning through Small Group Instruction: The study's recognition of the value of small group instruction as a means to facilitate preschool students' academic achievement reinforces the significance of tailored education. Educators should establish small-group settings where personalized instruction can occur. Such an approach permits educators to identify individual needs and design targeted interventions that address specific learning gaps, ensuring that each child receives the guidance they require for optimal growth.

In essence, these implications collectively advocate for a transformation in early childhood education that embraces dynamic teaching strategies, inclusivity, assessment-driven adaptations, and a renewed focus on practical engagement. The research encourages educators to adopt a multifaceted approach that fosters holistic growth, acknowledging the unique attributes of each learner and preparing them for a future marked by academic prowess and personal enrichment.

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Ethical approval

In the writing process of the study titled "**Exploring the potential of play-based learning interventions for academic success: An action research project on improving preschool students' number mastery**", the rules of scientific, ethical and citation were followed; it was undertaken by the authors of this study that no falsification was made on the collected data, "Journal Action Qualitative & Mixed Methods Research [JAQMER] and Editor" had no responsibility for all ethical violations to be faced, and all responsibility belongs to the authors and that the study was not submitted for evaluation to any other academic publishing environment.

Ethics committee approval

A review board approval of the research before the project started was obtained from the University's Institutional Review Board (IRB Approval Number: 091421-1).

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Students, teachers and principals' views on the effects of school gyms on functioning of school

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Abstract. In this study, the views of students, teachers, and principals on the effects of gyms in schools on functioning of school were sought. The research is based on views of principals and teachers working in schools with gyms in Manavgat during the 2021-2022 academic year and students studying in these schools. The research was designed in qualitative descriptive phenomenology. Semi-structured interview forms were used to collect the research data. According to the findings of the research, it can be said that the school principal, students, and teachers had a positive perception of the gym in schools. In line with the results, it was suggested that all schools affiliated with the Ministry of National Education should have gyms and that the physical capacity of the gyms in these schools should be increased.

Keywords: School gyms, students, principals, teachers

Introduction

The importance of sports and physical education courses in our lives is quite wide. The most important benefit of sports and physical education courses in our lives is physical health. Sports and physical education play an important role in maintaining and improving our physical health. Exercising regularly supports muscle and bone health, increases cardiovascular endurance, and reduces the risk of many chronic diseases such as obesity, heart disease, and diabetes. It also contributes to the development of basic physical abilities such as mobility, flexibility and balance. At the same time, sports and physical education have positive effects on our mental health. Exercising reduces stress, improves mood, and helps prevent mental health problems such as depression and anxiety In addition, sports activities increase self-confidence, improve self-discipline, and improve learning capacity and cognitive functions (Bailey, 2004; Kılıç, 2015).

People who do sports not only grow socially, but also have more positive effects socially and mentally, as well as physical and mental benefits. Bad habits are the biggest problem for individuals and parents today, but doing sports creates a protective shield by preventing the formation of bad habits (Erbaş, Göral, & Kalemoğlu 2016).Today's popular sports are considered divided into social, mental, physical and material areas. Additionally, while sports positively affect people's emotional states, they also contribute to their physical development Doing sports helps the person to see the limit of what they can do, to recognize their essence and to do something by revealing their talents and creative areas with this definition. Without discriminating as a person or a team, doing sports helps interaction between individuals by reaching team spirit in teamwork. By multiplying their friendship areas, people who are in harmony with life together can thus be together. They can use their free time as effectively and efficiently as possible and help them develop in many other areas. The desire to win in sports is more of a balancing act than a bad competition. While this positive competitive environment has a positive effect on people's lives, it plays a positive role in the interaction between people by reducing the limitless wants

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and desires in their social environment. (Karataş, 2019). In addition to all these, since sports are universal, doing sports will teach people to be respectful, loving and understanding in response to people living in different geographies by changing the perspective of individuals and changing their perspectives

Sports contribute to the development of social skills through team games and group activities. Team sports help to acquire skills such as collaboration, leadership, communication, and problem-solving. In addition, sporting events and competitions encourage the formation of friendships between people and strengthen social relationships. In addition, sports and physical education teach discipline and the discipline of learning. Sports activities require regular training and preparation (Yaylacı, 2007). This provides students with important skills such as time management, responsibility, and goal setting. At the same time, sport emphasizes the importance of working for success, accepting failures, and continuous improvement. Therefore physical education in schools is useful for adopting a healthy lifestyle and staying active throughout life. These classes teach students the importance of playing sports and incorporating physical activity into their daily routine, helping them to lead a healthy life in the future (Arıcı, 2004). Thus, the importance of sports and physical education courses in our lives is of importance as doing sports supports our physical and mental health, contributes to our social and skill development, teaches discipline and learning discipline, and ensures the formation of healthy lifestyle habits.

In the study, it was aimed to interpret the views of principals, teachers and students on the effects of gyms in schools affiliated to the Ministry of National Education on students, teachers, principals and the general functioning of the school. In addition, it is important to understand the views of students, teachers and principals who have a gym in their school regarding the effects of the gym on students, teachers, principals and the general functioning of the school, to understand how the gyms are perceived by the students, teachers and principals who use them, and to reveal the benefits of the gyms by the users.

The problem statement and sub-problems of the research were expressed as follows:

Problem Statement

What are students, teachers and principals' views on the effects of gyms in schools on functioning of the school?

Sub-Problems:

1. What are students, teachers and principals' views on gyms?
2. What are students, teachers and principals' views on the effect of teaching the physical education course in the gyms on the efficiency of the course?
3. What are students, teachers and principals' views on the effect of the use of gyms in terms students' behaviors on the courses other than physical education class?
4. What are the principals' positive or negative views on the attitudes and behaviors of the students who use the gym?
5. What are students, teachers and principals' views on the effect of gyms on school success?
6. What are students, teachers and principals' suggestions for more efficient use of gyms?

Methodology

Method and paradigm of research

The research was qualitative and a descriptive phenomenology design was used in the research. Qualitative research is a method that analyzes research questions with an interpretive approach (Lincoln

& Guba, 1985, Gunbayi & Sorm, 2018). Each phenomenon or event that is the subject of the study is in its own context and the meanings that people attribute to them are interpreted. Thus, the aim of the phenomenological study is to find out the essence of participants' perception of lived experiences (Creswell, 1998; Patton, 1990).

Sampling

The population of the study consisted of 7 principals and 230 teachers working in schools with gyms in Antalya Manavgat and 3435 students studying in these schools. The sample of the study consisted of 4 principals, 6 teachers (3 Physical Education teachers and 3 teachers in different branches) and 9 students selected by convenient sampling, (Table 1.)

Table 1. Information about principal and teacher participants

Participant	Age	Gender	Branch	School of Work
P1	45	Male	Manager	High school
P2	40	Male	Manager	High school
P3	37	Male	Manager	High school
P4	49	Woman	Manager	High school
T1	40	Male	Science	High school
T2	32	Woman	Visual Arts	High school
T3	30	Male	Math	High school
T4	39	Woman	Physical education	High school
T5	42	Male	Physical education	High school
T6	45	Male	Physical education	High school

Data collection

The study data were obtained by using the semi-structured interview form, which was finalized after the pilot interviews, and a theoretical framework created based on the literature review. With semi-structured interview forms, the views of principals and subject teachers working in high schools and the students on the effects of school gyms on functioning of the school were recorded with interviews conducted with 30-45 minute interviews in order to find answers to sub-problems.

Ethics statement

Ethics Committee Approval of this research was obtained from Akdeniz University Social Sciences Ethics Committee at the meeting of 15 decision numbered 312 on September 8th, 2022, formal permission was obtained from the Antalya Provincial Directorate of National Education for the research numbered E-98057890-605.01-61022341 on October 17th, 2022, an informed consent form was obtained from the participants before the interview and participants were informed that their names would not be mentioned and be given the alphabetical codes for principals as P1, P2, P3, P4, for teachers as T1, T2, T3, T4, T5,T6 and for students S1, S2, S3, S4, S5, S6, S7, S8 and S9.

Rigour

In order to get validity and reliability criteria of a qualitative research, it is considered appropriate to use internal validity (credibility), external validity (transferability) and inner reliability (confirmability) and outer reliability (dependability) criteria (Lincoln & Guba , 1985). In order to ensure the internal validity of the study, semi-structured interview form was finalized after the pilot interviews and a theoretical framework of the interview form was created based on the literature review. In order to ensure the external validity (transferability) analytical generalization was made to a theory in discussion. In order to increase the internal reliability (dependability) of the research, all of the findings was given without comment. In addition, the consistency rate (Kappa Value) was calculated as .083, almost perfect

agreement by comparing the codes by the researcher and a second person (Landis and Koch 1977). In order to increase the external reliability (dependability) of the research, the researchers ensured to present on demand all the data collection tools, raw data, coding during the analysis phase, and the perceptions, notes, writings and inferences that form the basis of the report to an expert other than the project team (Lincoln & Guba, 1985; Gunbayi, 2018).

Data analysis

In the study, descriptive analysis was carried out, the results were presented with a descriptive manner and verbatim quotations were included, the findings obtained within the framework of the emerging themes and patterns were classified in line with the research objectives by using a qualitative software Nvivo 10 (Kelle, 1995; Cohen, Mannion, & Morrison, 2007).

Findings

1. Students, teachers and principals' views on gyms

The statements by the participants on gyms were examined according to school principals, students and teachers. All of the statements of principals were positive (f=4), the statements of eight of the students were positive (f=8) but one was negative (f=1) and the statements of five of the teachers were positive (f=5) but one was negative (f=1).

The views of some of the principal participants are given below:

> *I think gyms are extremely important for education. I think sports are essential for raising healthy generations. In this case, I think that the presence of gyms in schools will have a positive effect (P3).*
>
> *I think there should be gyms in every school, even in every neighborhood. Especially in the basic education section, the benefit of gyms is very clearly seen (P4).*

The views of some of the student participants are given below:

> *It's a social place, a space where you can show off your talents. We are able to show most of our talents in the gym, my perception of the gym is positive (S4).*
>
> *It is much better for us to have a gym, because as a science high school student, our classes are predominant. Therefore, we need places and spaces where we need to relieve stress. Therefore, we can use it effectively in gyms. That's my perception, it's good.(S7)*
>
> *The presence of gyms in schools also increases the contribution of students to their courses. Because we can go and socialize with our friends in our free time, we can attend courses better with a relaxed head because we socialize (S9).*

The views of some of the teacher participants are given below:

> *Of course, gyms have a positive perception for us teachers, especially in schools, as they offer a fun learning environment and as a result, they provide efficient learning (T1).*
>
> *In schools with gyms, gyms are very valuable in terms of children's development and the diversity of their physical activities. Unfortunately, there are very few gyms in our district, I think that schools with halls and gyms are very lucky, I think it is beneficial for the development of children (T4).*

My thoughts towards gyms are positive. In fact, I believe that every school should have gyms as much as possible, starting from kindergarten. ...In addition, public gyms should be built in certain areas in the neighborhoods, where children can discover themselves, young people can do sports and relax, and people who are close to the point of being old can do sports in terms of exercising their bodies and there should be a gym that can be in the neighborhoods. Yes, the cost is very high, but let's say I think it is thought that two or three can be done on the basis of our district (T6).

When participants' views on gyms were examined in general, it can be said that almost all of the participants had positive views about the gym. It was found that only one student and one teacher had negative views on gyms.

2. The effect of teaching the physical education course in the gyms on the efficiency of the course

The statements by the participants on the effect of teaching the physical education course in the gyms on the efficiency of the course were analyzed according to principals, students and teachers. All of the statements of principals (f=4), students (f=9) and teachers (f=6) were positive.

The views of some of the principal participants are given below:

Physical education courses are taught more easily in gyms, students' motivation becomes more efficient, and the perception that many sports trainings are carried out in different branches according to the capacity of the hall is revealed (P1).

It is a 100% efficient area because our physical education teachers carry out the course work they do for our students during their courses by using our halls at the maximum level, so I think it increases productivity by 100% (P2).

The views of some of the student participants are given below:

Thanks to the hall, we develop our skills and try to take them to the top. Thanks to our teacher, he helps us (S4).

Since almost all kinds of sports equipment are materials and equipment in gyms, it benefits us both as a place to do the desired sports in physical education class and in terms of avoiding weather events, which indoor gyms provide. And for its efficiency, we can easily do the sport we want because it has all kinds of tools (S7).

Of course, as with any course, if we are studying biology, if a biology laboratory is required, then a gym is mandatory for physical education. From my point of view, this allows us to use it better and more effectively for physical education and to deal with various areas. Since the gym gives enough space, it is processed more easily and effectively. (S8).

The views of some of the teacher participants are given below:

Especially in unfavorable weather conditions, the presence of a gym provides convenience to us in terms of Physical Education course. In addition, having team branches such as volleyball and basketball in the gym provides an additional advantage for us. At the same time, I think that when students study in the gym, they are better motivated and more productive (T1).

I think it's a really good thing in terms of putting the theoretical training in the physical education class into practice, and I see gyms as a place where talents emerge (T5).

Of course, having a hall is a big advantage. Our materials are ready, our lines are ready, there are all kinds of conveniences. It's much easier to get kids motivated (T6).

When participants' views on the effect of teaching the physical education course in the gyms on the efficiency of the course were examined in general, it was found that all of the participants had positive views on the effect of teaching the physical education course in the gyms on the efficiency of the course.

3. The effect of the use of gyms in terms students' behaviors on the courses other than physical education class

The statements by the participants on the effect of the use of gyms in terms students' behaviors on the courses other than physical education class were examined according to principals, students and teachers. All of the statements of principals were positive (f=4), the statements of five of the students were positive (f=5) but four negative (f=4) and all of the statements of teachers were positive (f =6).

The views of some of the principal participants are given below.

> *As I just mentioned, our other teachers also do other activities in the hall in addition to physical education courses in my classes. They also receive positive feedback from our children from these activities. When we look at the characteristics of our school and the characteristics of our students, we also use our hall for our children's social activities, entertainment and games. Therefore, we always receive positive feedback in our hall. There is no negativity (P2).*
>
> *In this regard, the use of gyms by our students both in physical education classes and in free hours prevents our students from some negative behaviors. Since they give their energy to sports, we can prevent some bad habits in this regard. At the same time, I think that there is a different motivation in other classes after the activity held there during the day (P3).*

The positive views of some of the student participants are given below.

> *It's nice when we use the gym outside of class, it relieves our boredom and I find it positive in this respect (S5).*
>
> *On the positive side, if you're the user, you can spend your time fun and useful in any way you want (S7).*

The negative view of one of the student participants is given below.

> *They're causing discomfort by misusing the hall. Sometimes there is a lot of noise, they hit the basketball inside, even though it is forbidden. They can cause some discomfort when we don't have a teacher, but they can't do that when there is a teacher (S4).*

The views of some of the teacher participants are given below.

> *If you ask as all schools, of course, it reflects positively, because our children cannot use their energy at home because our age is the age of technology. At least in physical education classes, we try to get rid of them a little bit so that our children can move at least a little bit and become aware of their skills (T3).*
>
> *After teaching the physical education course in the gym, our students have the chance to learn and play more comfortably in the gym, of course, so when they enter other classes, they put us in an advantageous situation and make our students ready to learn (T4).*
>
> *So friends have positive thoughts. Our children who play sports are more successful, more respectful, and feel more connected to the school (T6).*

When participants' views on the effect of the use of gyms in terms students' behaviors on the courses other than physical education class were examined, all of the principals and teachers stated that the students' use of the gym had a positive effect on student behavior. But while five of the students said

that the students' use of the gym had a positive effect on student behavior, four of them said that it reflected negatively on student behavior.

4. Positive or negative views on the attitudes and behaviors of the students who used the gym

The statements by the participants on positive or negative views on the attitudes and behaviors of the students who used the gym were examined according to principals, students and teachers. All of the statements of principals were positive (f=4) the statements of seven of the students were positive (f=7) but three negative (f=3) and the statements of teachers were three positive (f=3) and three negative (f=3).

The views of some of the principal participants are given below.

> *The development of sports awareness in the students who use the gyms makes an important contribution to the school administration. We see that it has a positive effect on the behavior of the students who use the halls in terms of fulfilling their responsibilities and improving their behavior (P1).*
>
> *We have stated that the students who use the gym have internal discipline. There are many positive aspects, and the negative aspects can sometimes cause accidents. A little more precautions need to be taken in this regard, it is a little difficult to control. I think that having a responsible person at the head of the students who play sports will eliminate these problems (P4).*

The positive views of some of the student participants are given below.

> *Students use the gym when their classes are free, so I find it positive. And they use it very regularly. But I find it even more productive for some students to use the gym by doing sports instead of having fun (S5).*
>
> *Positively, most of the students are responsible and they don't have any negative behavior, no harm to other students or the gym. In other words, I did not see any negative activity or attitude in this way (S7).*

The negative view of one of the student participants is given below.

> *Students who use the gym are damaging the walls of the gym, it's not good for them to damage it. I think they should be more careful when they do activities in the gym (S6).*

The views of some of the teacher participants are given below.

> *In schools with gyms, due to the financial conditions of the children, they have to come with all kinds of shoes during the course, so the wear and tear of the hall is a little too much, we can look at it negatively. Children may come to the gyms in places where the social and cultural structure is good with spare shoes, but since this is not suitable for the physical conditions and social environment conditions of the students in our school, they may have a negative opinion about this issue. On the other hand, we have always received the support of your school administration about the hall, we thank them. (T4).*
>
> *My observations are that while there is a positive development in general, I think that only students should be made aware of the use of tools and inventories and how to use them in relation to the environment, for example, in terms of not polluting the environment (T5).*

When participants' positive or negative views on the attitudes and behaviors of the students who use the gym were examined, all of the principals expressed positive views about the attitudes and behaviors of the students who used the gym and most of the students' views were positive except three. While half

of the teachers stated that the use of the gym reflected positively on the attitudes and behaviors of the students, and half of them said that it reflected negatively on them.

5. The effect of gyms on school success

The statements by students, teachers and principals on the effect of gyms on school success were examined according school principals, students and teachers and all of the statements of principals(f=4), students (f=9) and teachers(f=6) were positive.

The views of some of the principal participants are given below.

> *Having gyms contributes to the positive outlook of the student. The development of sports education in the halls also contributes positively to the success of the students in their academic courses. Because with the education students receive here, they become aware of taking responsibility and fulfilling their duties. We also see that they perform more behaviors that will contribute to their academic development in the future (P1).*

> *It has a very positive impact on the school's success, especially its academic success. Here we see that we are a science high school, children who do sports are really different from others and they come to much better points. You see that the child plays football very well, plays basketball or table tennis very well; at the same time, the child achieves tremendous academic success. I had a student who was playing football very well, for example, he ranked 610th in Turkey in YKS in the university exam, we have students who are in the top thousand who are successful in table tennis and are academically successful. Sport definitely has a positive impact on academic achievement (P4).*

The views of some of the student participants are given below.

> *If we think about sports success in gyms first, we can perform and achieve sports success against other schools in school sports because we can work thanks to the gym. Apart from that, in terms of academic success in school success, when we do sports, we can focus on the course because it develops our brain as a social activity and we can spend our time fun because we are not bored, we do not get distracted. That's why we are able to achieve academic success in a more focused way (S7).*

> *I think it has a positive impact on our school success. Because, according to a scientific study, we can focus better because people who do sports have higher happiness hormones. Therefore, since such a field is also given, it affects our courses well, because we need to relieve stress (S8).*

> *Since students who use the gym are physically healthier and mentally more vigorous, it positively affects school success (S9).*

The views of some of the teacher participants are given below.

> *I mean, when you say school success in schools with gyms, you know, in the academic sense or in the other sense? As I said at the beginning, since children are now in the age of technology, children are at least discharging some of their energy because they are sitting still at home, and I think this energy discharge makes it easier for children to study while sitting. In other words, it has an impact on your academic success, because in individual sports, especially in team sports, what it means to be a team, what it means to enjoy individual success, this is reflected in your other courses (T3).*

> *I really think that gyms have a 100% positive effect on the student's motivation in all subjects and their determination and willingness to study all subjects and their success in all subjects (T5).*

When we consider the development of children as a process, it is not only academically; we also care about their social and cultural sports achievements. In my own opinion, I think that children in schools with gyms are more interactive with other subjects and contribute more to their development (T6).

When students, teachers and principals' views on the effect of gyms on school success were examined, all of the school principal, students and teachers stated that the effect of the gyms on school success was positive.

6. Suggestions for more efficient use of gyms

The suggestions for more efficient use of gyms by the participants were examined according to principals, students and teachers. For principals increasing the usage time of the gym (f=2), increasing the physical capacity of the gym (f=1), having sufficient personnel in the gym (f=1) were sub-themes , for students: increasing the usage time of the gym (f=4), increasing the number of sports competitions (f=2), increasing the adequacy of gym equipment (f=2), increasing the cleanliness of the gym (f=1) and for teachers increasing the usage time of the gym (f=3), increasing the physical capacity of the gym (f=1), having sufficient personnel in the gym (f=1) and increasing the gym equipment (f=1).

The views of some of the principal participants are given below.

In order to use sports hall more efficiently, the priority is to contribute more to the maintenance and repair of the problems. Keeping the halls open more by creating personnel in charge of the halls. In addition, it is thought that planning the use of the hall and especially ensuring that other schools and clubs that will use the hall use the hall continuously with a healthy planning can be realized (P1).

The views of some of the student participants are given below.

We need more time, a course doesn't help anyone (S4).

In general, we can do the following in order to use them more efficiently: Indoor games, whether it is basketball, volleyball, football, they are mostly played in outdoor areas and whether it is table tennis or volleyball training, etc., in the gym will cause us to use it more efficiently. In addition, since the physical education courses do not overlap, since the 2 classes are together, there will automatically be more people in an area and we will not be able to use this area effectively. Therefore, it will be much better if our courses do not overlap, so that we can use them more efficiently (S8).

I think that the clocks of the teams that use the gym should be adjusted more appropriately. I think that the use planning of the hall should be done well (S9).

The views of some of the teacher participants are given below.

In order for gyms to be used more efficiently, different events need to be given more space. I would also like to express my opinion that the student should be given the time and opportunity to showcase his or her talents in the gyms while the student is in school (T4).

I think this is the most important issue here, in cooperation with the municipality and using the gym cleanly at all times. I think that our school and other clubs that will use the gym will be more efficient in the operation of the hall if it is done within a program and organizes it, at what time, for what purpose, within a certain plan and program (T5).

Outside of the classroom, we can say that it can be used openly to everyone with more planned, feasible planning (T6).

When themes for suggestions for more efficient use of gyms examined in general, the views of the school principal, students and teachers on increasing the time to use the gym in order to use the gym more efficiently were mentioned more.

Discussion

In this research it was understood and interpreted the views of principals, teachers and students on the effects of gyms in schools affiliated to the Ministry of National Education on students, teachers, principals and general functioning of the school. In this context, in the 2021-2022 academic year, the views of 4 school principals, 6 teachers and 9 students were obtained from the principals and teachers working in the schools with gyms in Manavgat and the students studying in these schools. This research is the first qualitative research in Turkey that aimed to determine the views of principals, teachers and students about the effects of gyms in schools affiliated to the Ministry of National Education on students, teachers, principals and general functioning of the school in Turkey. Therefore, the research findings are very limited in terms of comparison with other researches. Therefore, the findings of this research were discussed by comparing them with the findings of similar two researches on this topic in Turkey.

In this research, it was found that all schools affiliated to the Ministry of National Education must have a gym. It was also found out that in schools with gyms, students were better motivated to attend physical education classes. It was also revealed that physical education courses were taught better and more efficiently in schools with gyms. It can be said that the gym had a positive effect on the success of students in other subjects. Thus, it was concluded that the perceptions of school principals, students and teachers in the school gym were positive.

Similarly, according to the study conducted by Durdabak (2019), the attitudes of secondary school students in the central district of Edirne province towards physical education courses were compared according to whether there was a gym in their schools or not. As a result of the research, it was found that students in schools with gyms had a more positive attitude than students in schools without gyms. Additionally, this study found that students in schools with gyms were better motivated to attend physical education classes. It was found that physical education courses were taught better and more efficiently in schools with gyms.

In another study titled "Evaluation of the creation of a constructivist learning environment in physical education courses by teachers and students" by Elvan (2019), the views of teachers and students regarding the creation of a constructivist learning environment in physical education courses were evaluated and it was found that students who had a gym in their school had some important advantages. According to the results, it was also found that the students who had a gym had the ability to express themselves better, were able to empathize, supported positive thoughts and were able to process their courses in interaction and cooperation. These positive effects of the gym became even more evident in the courses where the constructivist learning approach was applied.

Conclusion

The first sub-problem of the research was "What are students, teachers and principals' views on gyms? ". According to the findings of the research, it can be said that the views of the school principal, students and teachers in the gym were positive. It was seen that only a teacher and a student had a negative perception of the gym.

The second sub-problem of the research was "What are students, teachers and principals' views on the effect of teaching the physical education course in the gyms on the efficiency of the course?" According to the findings of the study, all of the school principal, students and teachers participants said that the effect of physical education courses in the gym on course efficiency was positive.

The third sub-problem of the research was "What are students, teachers and principals' views on the effect of the use of gyms in terms students' behaviors on the courses other than physical education class?" According to the findings of the study, the school principal and the teacher said that all of the participants said that the students' use of the gym in other courses had a positive impact on student behavior. However, half of the students said that the students' use of the gym in other classes had a positive impact on student behavior, and half of them said that it reflected negatively on student behavior.

The fourth sub-problem of the research was "What are the principals' positive or negative views on the attitudes and behaviors of the students who use the gym?" According to the findings of the study, all of the school principal participants and the majority of the student participants expressed positive views about the attitudes and behaviors of the students using the gym. However, half of the teachers said that the use of the gym reflected positively on the attitudes and behaviors of the students, but half of them said that it reflected negatively on them.

The fifth sub-problem of the research was "What are students, teachers and principals' views on the effect of gyms on school success?" According to the findings of the study, all of the school principals, students and teachers said that the effect of the gym on school success was positive.

The sixth sub-problem of the research was "What are students, teachers and principals' suggestions for more efficient use of gyms?" According to the findings of the research, the views of the school principal, students and teachers to increase the time of using the gym came to the fore in order to use the gym more efficiently.

Recommendations

In line with the findings, following suggestions were put forward:

All schools affiliated to the Ministry of National Education should have a gym.

In schools with a gym, the physical capacity of the gym should be increased, the equipment deficiencies of the gym should be eliminated in a timely manner, and the time of use of the gym should be well planned and increased.

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Ethical approval

In the writing process of the study titled "**Students, teachers and principals' views on the effects of school gyms on functioning of the school**", the rules of scientific, ethical and citation were followed; it was undertaken by the authors of this study that no falsification was made on the collected data. "Journal Action Qualitative & Mixed Methods Research [JAQMER] and Editor" had no responsibility for all ethical violations to be encountered, and all responsibility belongs to the authors and that the study was not submitted for evaluation to any other academic publishing environment.

Ethics committee approval

Ethics Committee Approval of this research was obtained from Akdeniz University Social Sciences Ethics Committee at the meeting of 15 decision numbered 312 on September 8th, 2022.

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Applying socio-ecological perspectives semantic networks in managing community conservation areas in Ghana

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Abstract: This study purpose was to identify key nature conservation themes and their semantic interrelationships that could be considered in the establishment and management of Community Resource Management Areas (CREMAs) in Ghana. A qualitative descriptive phenomenological approach was used to interview nine CREMA leaders from three different locations in northern Ghana. Seventeen major socio-ecological themes were identified under three nature conservation domains of: 1) conservation objectives, 2) risk management and 3) sustainable economic opportunities. Three semantic networks were developed under the central domains where the 17 themes served as labelled nodes interlinked with seven labelled links of: 1) *is part of*, 2) *is associated with*, 3) *promotes*, 4) *produces*, 5) *is cause of*, 6) *is property of*, and 7) *contradicts*. The study findings indicate that there are intricate interrelated socio-ecological issues that CREMA managers should understand and appreciate to attain sustainable benefits. The application of livelihood incentives, creating awareness and law enforcement are key activities managers must implement together with others to achieve sustainable benefits in the CREMAs.

Keywords: CREMA, phenomenological studies, semantic networks, sustainability

Introduction

Collaborative nature conservation principles are implemented in an attempt to perfect human-nature interrelationships (Vining et al., 2008) especially in the utilization of natural resources to promote viable nature based enterprises that produce sustainable benefits (Drexhage & Murphy, 2010). Proponents of collaborative nature conservation principles suggest the involvement of local people helps in achieving both conservation and socio-economic development goals among multiple actors with their complex interrelationships on the communal landscape. Conley & Moote (2001) for example stated the involvement of local people in nature conservation is required because: 1) they depend on the resources for livelihoods, 2) they have in-depth knowledge in the management of the resources, and 3) central government management alone is insufficient due to corruption and inadequate funding. Again, local people demonstrate their participation with responsibility and stewardship towards nature to improve their conservation goals and socio-economic development (Lockwood et al., 2010).

Collaborative nature conservation principles implementation is also important to avoid nature utilization rights exclusion; where the most powerful concessionaires enjoy the better share to the neglect of the weak who may reside in the affected areas. Again, Conley & Moote (2001) asserted four issues ought to be considered during nature conservation planning and development if the problem of exclusion is to be eliminated. They are: 1) all actors should be allowed to state their interests, values, needs and

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concerns, 2) all identified issues should be included, 3) all actors should be engaged at all stages, and 4) all actors should be involved in the decision-making process.

However, contention always exists between different stakeholders' demands and expectations on biodiversity under conservation. Stakeholders' contentions range from local community members who feel they have been deprived of their rights to utilize biodiversity resources to merchants who think economic resources are being held without any utilitarian benefits. Also, these demands and expectations from community members and merchants are in opposition to the conservation practitioners' perspectives that promote non-consumptive values of biodiversity. Thus, implementing such multi-stakeholder engagements in collaborative nature conservation requires all the actors also to trade off entrenched stances to achieve compromised desirable goals (Kopnina, 2012).

Consequently, collaborative nature conservation programming which is seen as one of the panaceas to achieving sustainable biodiversity conservation and socio-economic development goals have been executed with participatory management approaches in many countries (Jones & Erdmann, 2013; Roe et al., 2009). Notwithstanding, the nature conservationists and socio-economic development policy makers are still confronted with a challenge to achieve a proper balance between the two opposing values on the communal landscape. This study applied qualitative semantic networks to explore an understanding and appreciation to the complex socio-ecological interactions (Rodrigues & Pietrocola, 2020) that occur in collaborative nature conservation ranges called Community Resource Management Areas (CREMAs) in Ghana.

Socio-ecological perspectives of participatory nature conservation

Agrawal & Gibson (1999) stated collaborative nature conservation programmes are founded on an image of a pristine ecosystem with an isolated local people who live in harmony on the landscape. The notion is that the local peoples' knowledge and the values they placed on the resources prevent them from abusing their control and utilization rights. The premise is that such an ecosystem with its human inhabitants is separated from the state and the negative effect of capitalism propelled by a free market system (Kopnina, 2012). Thus, promoting a pristine ecosystem that is free from human interferences from the conservationists' perspective which pits against the profit making industrialists' views of human socio-economic wellbeing contingent on commercial exploitation of natural resources.

Also, an ecosystem at its climax functions well with the capacity to provide services that benefit both human socio-economic demands and other biological species' functions. Striving to achieve such an ecosystem has framed the basis for setting up governance frameworks for both central government protected areas and off reserved management regimes even under community collaborative conservation. Biodiversity governance laws formulated to regulate natural resources utilization in protected and off reserved areas differ in many countries; with stringent application of laws in protected areas than off reserved areas (Shafer, 2015).

The above notwithstanding, the argument is that human interactions within ecosystems are historic which have changed the landscape many times, therefore, what is considered a productive ecosystem is as a result of human influences. Agrawal & Gibson (1999) pointed out that historical research suggests there is no truth in the assertion that community people are friendly to ecosystems because they live closer to the resources. That is, on the community collaborative conservation landscape, human interferences in the ecosystem still exist (Agyare, 2013; Brooks et al., 2013) and therefore community people's interaction with nature is a function of their utility interest (McDougal, 2010). Thus, it is the perspectives of actors involve in community collaborative resource management that determine whether outcomes generated from the consumptive and non-consumptive values of biodiversity are positive or negative.

Bixler et al. (2015) stated *participation* as used in collaborative conservation programmes lacks clarity because it is used to represent all sorts of nature conservation arrangements. The authors reiterated that in most cases the degree and the sort of participation is not clearly mentioned leading to all manner of challenges in the implementation of the resources governance arrangements. The myriad of actors, the

complexities and uncertainties associated with their interests, values, needs and concerns make participatory nature conservation implementation challenging (Brooks et al., 2013). Therefore participatory nature conservation governance should be built on citizenship engagement; considering its power relation, personal interests and benefits sharing arrangements (Agrawal & Gibson, 1999; Lockwood et al., 2010).

Again the definition of *community* in collaborative nature conservation programmes has been criticized; according to Agrawal & Gibson (1999), community in the conservation context has been defined as a small spatial area with homogenous people who share similar norms. The argument against this description is that it fails to identify the differences that exist in communities in regard to the processes, politics and alliances in nature conservation and its utilization arrangements. Defining a community as a small spatial area is a territorial concept that fails to acknowledge the movements of the people in and out of that space. Movements of people and their interactions with outsiders have impacts on their shared norms and the homogeneity that exist among them (Vining et al., 2008). Consequently, focus should rather be on the established communal norms that determine the outcomes of peoples' interactions and the political processes within communities.

Uncertainties and complexities in nature conservation exist due to: 1) knowledge gaps in different species interactions, 2) difficulties in understanding the intricacies in the interrelationships between species and their living environment (Stevens & Tello, 2011), and 3) unpredictable impacts of certain external factors like climate change (Sarkar et al., 2004). These uncertainties and complexities make Lockwood et al.'s (2010) call for greater integration and coordination to accommodate multiple factors in the temporal and spatial scales of nature conservation noteworthy. Participatory nature conservation programme implementation in the CREMAs thus seeks to improve the interactions and coordination among natural resources managers, scientists, policy makers and the general public to attain sustainable benefits where biodiversity resources are utilized to promote viable socio-economic development.

Participatory nature conservation issues in CREMAs

The CREMA model in Ghana is a participatory nature conservation institution built on local community governance structures to receive and implement a devolved authority from the central government (Agyare, 2013; Bandoh, 2010). A CREMA is operationally defined to represent a geographically demarcated area that has adequate natural resources or has the potential to improve the condition of the resources, for the locally established institution and governance structures to sustainably manage for communal benefits. The CREMA establishment objective is to encourage local people to integrate nature conservation into their farming and other legitimate land use systems (Asare et al., 2013) and to leverage on the governance structures to promote socio-economic wellbeing (Owusu-Ansah, 2021). The CREMA model does not follow strict nature protection regimes on the communal landscapes, but it provides opportunities for sustainable utilization strategies to be adopted by the local people. The model is a participatory nature conservation approach that promotes democratic communication channels for proper natural resources governance and conservation (Conley & Moote, 2001); provides incentives to reduce poaching (Agyare, 2013); seeks paths for sustainable socio-economic development (Drexhage & Murphy, 2010) and explores to perfect the interrelationship that exists between humans and nature (Vining et al., 2008).

The law in Ghana prescribes that all natural resources in protected areas and off protected areas belong to the state (Kotey et al., 1998 cited in Ekpe et al., 2014). This provision in the law to some extent marginalizes and excludes local people in the governance and utilization of the resources. Incorporating inclusive principles in developing the CREMA model with its benefit sharing arrangements in Ghana is not only aimed at addressing the problem of exclusion and marginalization, but also to conserve the resources for the benefits of current and future generations by creating a sense of ownership for the local people. The CREMA model seeks to achieve citizenship participation in rule-making (Agyare, 2013), and establish local institutions and governance structures to administer procedural justice on the agreed rules in nature conservation on the communal landscape (Conley & Moote, 2001).

According to Joseph et al. (2008) budgetary constraints, evolutionary distinctiveness of ecosystems and values placed on species are some considerations that influence conservation objectives. Similarly, CREMA conservation objectives are generally founded on the participating stakeholders' considerations on the biological and economic values placed on the resources and also their vulnerability to utilization pressures. Mostly, society places more emphasis on the socio-economic contributions of the resources to influence values placed on them (Kopina, 2012; Vining et al., 2008). However, the premium given to socio-economic importance of biological resources presents risks that threaten conservation objectives. Unfortunately, the threat to conservation objectives also undermines the economic values of the resources in the long term due to unsustainable harvesting (Game et al., 2013).

The CREMA model principles are beautifully crafted, however there are challenges that hinder their implementation. For example, implementers sometimes find it difficult to persuade some communities to accept the principles of the CREMA because such communities view the approach as a means for the central government to cunningly annex their lands for a protected area establishment. Shafer (2015) similarly reported how certain communities in Africa and Latin America view the creation of buffer zones along protected areas as external actors' way of incorporating those lands into the protected areas. Another implementation challenge is where CREMA members sometimes feel some of the restrictive and prohibitory sanctions that govern the CREMAs limit their economic livelihood activities; notwithstanding that those very regulations were generated by themselves (Bandoh, 2010). These challenges create disenchantment among community members (Agrawal & Gibson, 1999) leading to poaching, illegal logging and other unsustainable nature degradative practices like overgrazing and illegal fishing being continuously reported in the CREMAs. The above arguments indicate an understanding and appreciation of the interrelationships that exist among conservation objectives, conservation risks and sustainable economic opportunities of the CREMAs would promote effective management.

Two research questions were asked for this study. 1) What socio-ecological issues are considered most relevant by CREMA leaders to establish functional community conservation areas? 2) How do the socio-ecological issues identified logically interrelate with each other in semantic networks around three domains of (I) Conservation Objectives, (II) Risk Management and (III) Sustainable Economic Opportunities?

Application of semantic networks to CREMA conservation objectives, risks management and sustainable socio-economic opportunities

Semantic networks graphically represent knowledge which is made up of nodes and their relations (Osorio-Forero et al., 2019). Majumder & Khanra (2015) showed semantic networks are mainly made up of two parts. First, there is the vocabulary part that denote labeled nodes and labeled links. The second is the structural part made up of the nodes and the links' interrelationships that give meanings associated between nodes and links. The semantic networks used for this study were designed around three central domains.

Osorio-Forero et al. (2019) stated semantic network methodologies permit speedy and simplified meaning in modelling qualitative content. Other advantages of representing knowledge in semantic networks is its flexibility, transparency and beauty (Majumder & Khanra, 2015; Steyvers & Tenenbaum, 2005). However, semantic networks application in knowledge development has some shortfalls. The disadvantages include possible loss of depth from the source information resulting in subjectivity in knowledge presentation (Osorio-Forero et al., 2019). Semantic networks also has the inability to expand on knowledge beyond certain bounds (Steyvers & Tenenbaum, 2005).

During interview sessions in this study, dialogue was applied to produce shared knowledge between the researcher and participants to reduce subjectivity (Rodrigues & Pietrocola, 2020). The approach helped in developing simple semantic networks around three central domains of: 1) Conservation Objectives,

2) Risk Management and 3) Sustainable Economic Opportunities. The researcher applied his socio-ecological perspectives to interview responses from nine CREMA leaders to develop the semantic networks. This exploratory research sought to develop shared knowledge (Rodrigues & Pietrocola, 2020) to understand and appreciate the interrelations among conservation factors that occur on the CREMA landscape.

The author of this study is an employee of the Wildlife Division of the Forestry Commission of Ghana where he has been involved in the establishment of CREMAs. This paper is generated from his doctoral dissertation where he applied qualitative phenomenological approach to study CREMA leaders' ecological worldviews and their impacts on nature conservation risk assessment. Dialogue was used during qualitative interviews to reduce possible biases from both the participants and the researcher and to bring out shared meaning. The researcher accepts community nature conservation programmes bring out positive outcomes by reducing the degradation of resources. He also believes local people can improve their livelihoods through effective resource management participation than the centralized government system that alienate them from benefits and control. Nonetheless, there are complexities in establishing and managing biodiversity resources in community conservation programmes like CREMAs. His experience shows CREMAs generally suffer from ineffective management which negatively affect sustainable conservation of the resources in the communal lands. It is noteworthy to state that this study does not constitute an official assessment of the studied sites by the researcher's employers.

Methodology

Study areas

Three CREMAs situated in the northern savanna zone of Ghana were selected for this study. The three study sites are Sayinga-Kasena-Gavara-Kara (SKGK), Wechiau Community Hippopotamus Sanctuary (WCHS) and Zukpiri Integrated Wildlife Sanctuary (ZIWS). Although the sites have differences in their establishment origins and the number of years they have existed as autonomous CREMAs, they also have similar nature conservation issues. The three sites are located in a comparable ecological landscape in the northern savanna zone of Ghana. Their similarities and differences provided opportunities to identify major issues that affect CREMA establishment and management. For example, issues of annual bushfires, poaching and illegal logging are reported within the selected sites. Also, the people of the study sites heavily rely on subsistence agriculture and collection of Non-Timber Forest Products (NTFPs) like Shea nuts, African Locust Bean and hunting of game to make a living.

Research Paradigm

The study was exploratory; aimed to understand and appreciate the socio-ecological issues of the CREMAs based on the lived experiences of interview participants. Descriptive qualitative phenomenological approach was used to allow the researcher and the participants to cross beyond themselves and into universal views (Groenewald, 2004) to create new insights. The application of phenomenological approach was to bring out lived experiences, consciousness and essences of the CREMA leaders' socio-ecological ideas (Sloan & Bowe, 2014). According to Finlay (2009) and Kafla (2011) phenomenological studies allow researchers and participants to stretch their understanding beyond the phenomenon under study to bring new perspectives on a subject. Nine CREMA leaders were interviewed to bring out their appreciation of the interrelation that exist among socio-ecological issues of the CREMAs.

A separate one on one interviews were conducted in the evenings after field visits to the CREMAs. The researcher visited the fields of the three conservation areas in the mornings to observe some conservation activities undertaken in the CREMAs. The field visits were used to shape up the approach to interviews. Dialogue was applied during interview sessions to produce shared knowledge between the researcher and participants to reduce subjectivity (Rodrigues & Pietrocola, 2020). This allowed for constructing

simple semantic networks around the three central domains of: 1) Conservation Objectives, 2) Risk Management and 3) Sustainable Economic Opportunities. The researcher allied his socio-ecological perspectives to interview responses from the nine CREMA leaders to develop the semantic networks.

Selecting participants for interviews

Three participants were selected from each of the three CREMAs for face-to-face interviews. The top management executives were purposively selected to fulfil the study's purpose to understand and appreciate the socio-ecological factors that influence CREMA management effectiveness as has been experienced by the leaders. The selected participants were well informed with CREMA leadership experiences having served as key implementers of nature conservation and socio-economic livelihood strategies for a number of years. Their leadership experiences ranged from five to 18 years. CREMA leadership is largely voluntary, the participants have had other engagements in their communities which made them suitable candidates to expatiate on nature conservation and socio-economic development. For example, five of the participants were members of their local District Assemblies whereas another was a chief of his community.

Boyd (2001) and also Creswell (1998) stated for phenomenological studies, selecting between two to 10 participants is enough to reach saturation point where no new significant data is generated from adding more participants. Thus, selecting nine participants from three different CREMAs expanded the study's scope which was important to ensure rigor and credibility.

Ethical issues of the study

The study design was approved by the Dissertation Review Board (SMC University Prospectus Review, 3/10/2017) of Swiss Management Center University. There was also no known legal barriers to undertaking this study. The researcher applied proper ethics (Laverty, 2003) in selecting and interviewing participants. Letters were written to the management executives of the SKGK, WCHS and ZIWS about the study. The executives were contacted via telephone and emails to determine their preparedness to take part in the interviews on the agreed date after the letters were sent. All the nine targeted participants agreed to participate and each was given a copy of a signed consent form on the day of interview. One of the respondent was not literate in the English Language, thus the consent form was read to him in the Twi Language (the language understand by both the researcher and this participant). Participants were told the study was for academic and practical purposes only and they had the choice to decline to be part at any point they feel to do so.

Data Collection

Separate face-to-face interviews were framed with a dialogue approach around the three central domains of conservation objectives, risk management and sustainable economic opportunities (Brooks et al., 2013; Game et al., 2013). Participants were asked about their lived experiences relating to major natural resources that existed in their CREMAs which has informed their conservation objectives, conservation threats and management activities. They were then asked to mention how their experiences have informed some socio-economic opportunities they have created to promote conservation objectives and reduce threats. Probing questions were asked to clarify issues. The researcher stated his understanding of the issues and their possible interrelatedness on socio-ecological landscape of the CREMAs to the participants at stages of the conversation. This approach enabled him to create a shared knowledge between himself and the participants. This follows Rodrigues & Pietrocola's (2020) assertion that shared knowledge could be developed through combine experiences between professionals and related key actors in an organization. Nature conservation and socio-economic issues identified and agreed on during interviews were used to develop semantic networks around the three central domains.

Interviews were video recorded after the researcher sought permission from participants (Downing, 2008). The essences from the non-verbal communication captured on video and the transcripts from the

interviews helped in the data analysis especially in helping to logically piecing together the semantic interrelationships. An assistant took the video recordings which allowed the researcher to concentrate on the interviews and also to take notes on salient points. The application of dialogue enabled the researcher and participants to move attention from the camera to concentrate on the interviews.

Semantic linkages applied in the study

Themes were developed from the nature conservation and socio-economic issues identified from interviews. The themes served as labeled nodes and they were linked to each other or to the central domains by seven labeled links. The labeled links were generated from shared meanings agreed between participants and the researcher. Table 1 provides the labeled links and their shared meanings.

Table 1.

Semantic linkages derived from interviews and their explanations

Labeled links	Interrelationship explanation
1. *Is cause of*	Theme that triggers actions to be taken on a central domain.
2. *Is part of*	Theme that shares in a central domain or in another theme.
3. *Is associated with*	Central domains/themes that directly or remotely influence the attainment of each other.
4. *Is property of*	Theme of belongingness to a central domain.
5. *Produces*	Consequential outcomes derived from a central domain.
6. *Promotes*	Central domain/theme that boosts the attainment of a central domain or another theme.
7. *Contradicts*	Themes that oppose each other.

Data Analysis

Each of the nine video recorded interviews was played in a free-to-use software called *easytranscript*. The researcher transcribed verbatim the audio contents of the videos. He also translated and transcribed directly into English Language the responses of the participant who spoke in a local dialect. The nine transcripts were edited for accuracy and also for the researcher to familiarize himself with the data in a Microsoft Word document. The edited transcripts were analyzed with the assistance of Atlas.ti software (version 7.0).

A code list was deductively pre-prepared in Microsoft Word and was uploaded into Atlas.ti for analysis. The researcher applied his experiences in community conservation management and from literature Agyare, 2013, Brooks et al., 2013 and Ekpe et al., 2014) to prepare the codes. Deductive coding approach has been justified by researchers' like King (2004) because it forces researchers to include or eliminate some codes in data analysis. Both semantic and latent interpretations informed codes development in this study (Braun & Clarke, 2006). Latent codes are theorized to inform interpretive content of participants' responses whereas semantic codes portray just what was said in interviews. The researcher's intent was to develop the latent interrelationships of conservation issues of the CREMAs in semantic networks.

Themes were also deductively developed (King, 2004). To reduce arbitrariness and subjectivity, standards were set in developing themes which were in line with Osorio-Forero et al.'s (2019) assertion on mathematical graph applications which is akin to techniques used in qualitative semantic networks. Computer supported applications for qualitative semantic networks has been developed on the basis of

mathematical applications in graph theory models (Conte et al., 2012 cited in Osorio-Forero et al.'s (2019). For example, graphs have two parts represented by sets of integers which are knitted together by edges. The integers and the edges respectively are similar to labeled nodes and labeled links found in semantic networks. Osorio-Forero et al. (2019) acknowledged expert subjectivity exist in developing morphological features of semantic networks in the context of language and cognitive research, yet, the use of graph theory could reduce arbitrariness. Again for example, Ferrer i Cancho & Solé, (2001) developed semantic networks from mathematical graphs based on word frequency in a qualitative interview. Similar principles were used to develop themes from codes based on percentages a code was attached to similar quotations from the nine transcripts. This process was facilitated by the codes-primary-documents-table facility found in Atlas.ti software.

In this study, a code was given thematic status if it was tagged to at least similar quotations from six transcripts (66.7%) out of the nine. However, other themes were formed from related codes which were tagged with different quotations but did not meet the threshold set above. For example, related codes that were attached to similar quotations from four (44.4%) or five (55.6%) transcripts out of the nine were merged to form a theme. Again, related codes that were tagged to similar quotations from three (33.3%) and another three (33.3%) or three (33.3%) and four (44.4%) or three (33.3%) and five (55.6%) transcripts out of the nine were combined to form a theme. There were no codes that were attached to two similar quotations or to only one quotation for consideration. For example, 'economic activities' was merged with 'green economy' to form a new theme called 'alternative livelihood' whereas waterbody conservation emerged from river conservation and water provision. The application of percentages brought consistency and clarity to the process of holding and merging codes into themes (Braun & Clarke, 2006).

Trail of activities and participants' confidentiality

The researcher took note of his trail of activities in data collection, analysis and results presentation to ensure transparency, rigor and credibility to the study. Separate face to face interviews were conducted in the offices of each CREMA after morning field visits to CREMA sites. Interview sessions with an individual lasted between 45 minutes and one and half hours. Probing questions were asked for participants to clarify issues. The researcher stated his understanding of the issues and their possible semantic linkages at stages of the conversation to create a shared knowledge between himself and participants.

Participants' privacy has been protected by labeling their statements at the results section. The labels used were A1, A2 and A3 for participants from WCHS, B1, B2 and B3 were from ZIWS and C1, C2 and C3 were from SKGK. Labeling was done not in any particular order or through any attributions that relate to participants' positions in the CREMAs.

Results

Nature Conservation and Socio-Economic Development Issues in CREMAs

Presentation of findings begins with theme development. The next section is on themes and their description derived from shared understanding from interviews. The central domains and their semantic linkages follow. The interrelatedness of identified themes with their central domains are then discussed. Participants' statements have been presented to support how themes were developed and such quotations have been *italicized*. Also, semantic linkages have been presented in *italicized* format in the write up.

Theme development and their semantic linkages

CREMAs are established through consultations with key stakeholders where conservation baseline data is collected to provide information on unique resources found on the landscape and how unsustainable exploitation threatens the resources. Thus, conservation baseline data and unsustainable nature

exploitation are two major *causal* themes for CREMA establishment. The two *causal* themes also form *parts* of activities applied to manage conservation risks leading to the development of sensitization and law enforcement strategies.

Participant's statement below depicts how *causal* themes lead to CREMA establishment. Themes like nature conservation, unsustainable nature exploitation, conservation baseline data and conservation motivation were developed from this and similar quotations.

> C1: *…the natural resources like plants and animals or the environment was fast depleting and it seemed not to be under anybody's cares… The involvement of the communities has helped…Surveys were conducted…we realized the resources were common for everybody and we were using them without taking into considerations any sustainability plan. That is what brought us to the establishment of the SKGK CREMA.*

CREMA establishment purpose is to manage unsustainable exploitation of resources. The above statement shows CREMAs are established after surveys have been conducted to collect credible data on available resources and threats that militate against its sustainability. Good data enables effective conservation objectives to be set up to manage pressures that threaten the resources sustainability.

Sustainable socio-economic opportunities initiated in the CREMAs provided the basis for developing themes like agency facilitation, alternative livelihood, sustainable NTFPs collection, tourism development and gender considerations meant to empower women. These programmes are purposively initiated to win community members' support.

> *B1: There was a meeting with a new NGO (Non-Governmental Organization) today and they are intending to assist us in agriculture and also help our women to process Shea nuts into butter. They are also bringing buyers to buy Dawadawa* (African Locust Bean). *They have just come and we are yet to start.*

> B3: *'Environmental Protection Agency of Ghana rushed in and introduced us to UNDP (United Nations Development Programme)/GEF (Global Environmental Facility) small grant project for support when we started. Ghana Tourism Authority also came in to support us on our tourism development plan'.*

Nature conservation projects in the CREMAs require external agencies facilitation to *promote* conservation ideals and socio-economic development goals to achieve sustainable benefits. B1 and B3 statements above and similar ones from the transcripts show how external agencies (both governmental and non-governmental) provide socio-economic opportunities for the CREMAs. Sustainable utilization programmes are designed for non-timber-forest-products to economically empower the people. Women economic empowerment is the main gender consideration particularly promoted in alternative livelihood programmes.

Themes like conservation motivation, sustainable benefits and change in attitude were developed from participants' responses to questions related to conservation objectives. Conservation motivation comprises the incentives that *cause* the CREMA leaders to lead their people with conservation objectives which are aimed to achieve sustainable benefits. The sustainable benefits consists of the dual outcomes of viable nature conservation and sustainable socio-economic development.

> A1:*…besides the plants and animal conservation, we also think about the cultural and economic motivation linkages…You know in the project we look for sustainability. If this generation is not there, other people have to take over and they have to get some knowledge. So the WCHS has built schools. We have two schools so far at vantage points so that children from two or three communities can attend. We have provided scholarships to about 40 students at the tertiary level (*i.e. after high school*).*

CREMAs establishment motivation are generally placed on conservation objectives that seek to protect plant and animal resources. Successes achieved in nature conservation in the CREMAs becomes pivotal

to attract socio-economic development projects. A1's statement above shows how by focusing on plants and animals conservation, other benefits like education infrastructure has been built for some communities.

A change in attitude that *promotes* a sense of communal ownership of the resources is the level of cooperation the CREMA leaders expect from community members. A major change in attitude mentioned by all the nine participants is themed 'peer risk management'; where community members foil illegal and unsustainable activities of other community members. To the participants, it was a measure of nature conservation success as it *part* in risk management. A2 made the statement below to depict how positive change in attitude of community members form *parts* in law enforcement.

> *…there was a time that some people wanted to fell a tree, I got a call and we moved in to stop them. Also you can see the change when a community member can question others for example why are you carrying a gun into your farm? ...people in the community will stop you or they will call the Sanctuary authorities when they found you out… Even when I am going around and small children see me, they hide their catapults* (slingshots).

CREMA members are expected to shift their views on the resources from the commons to a sense of ownership that *promote* communal benefits. For community members to report others or confront them for inappropriate use of the resources result from constant conservation sensitization, awareness creation and enforcing laws. The indication that even children within the CREMAs to understand the implications of illegal hunting, thereby resorting to hide their slingshots from authorities is a testament to change in attitude.

Identified socio-ecological themes of the CREMAS and their explanations

Seventeen different themes were developed under the three central domains. Conservation objectives had nine themes, risk management had eight themes and sustainable economic opportunities, 11 themes. Ten of the themes were exclusive to a particular central domain. However, unsustainable nature exploitation, sustainable benefits, conservation motivation and alternative livelihood were crosscutting themes appearing under all the central domains. Law enforcement, conservation sensitization and agency facilitation fell under at least two domains. The 17 themes, their descriptions and their related semantic linkages are shown in Table 2. Empty cell shows that themes is not valid under that domain.

Table 2.

Themes description and their semantic linkages to the Central Domains

Themes	Themes Description	Conservation Objective	Risk Management	Sustainable Economic Opportunities
Agency facilitation	Governmental and non-governmental agencies that facilitate socio-ecological activities in the CREMAs.	*Promotes*		*Promotes*
Alternative livelihood	Supportive programmes initiated to promote nature conservation and to improve living standards of members.	*Promotes*	*Promotes*	*Is property of*
Change in attitude	Changes that occur in community members' perception and behaviour to accept nature conservation.		*Is part of*	
Conservation baseline data	Status of unique flora and fauna species including their socio-economic importance in the CREMAs.	*Is cause of*		

Conservation motivation	The incentive to conserve an ecosystem or flora or fauna species because of their utility and amenity values.	*Is cause of*	*Promotes*	*Promotes*
Conservation sensitization	Educational and nature conservation awareness programmes carried out to make people understand conservation issues.		*Is part of*	*Promotes*
Cultural conservation	The importance attached to the conservation of nature because they have inherent cultural values to the people.	*Is part of*		
Gender considerations	Socio-economic opportunities created on gender considerations with emphasis to support women.			*Is part of*
Law enforcement	All regulations and restrictions used to curb illegal and unsustainable nature conservation threats.		*Is part of*	*Promotes*
Nature conservation	Unique flora and fauna species conserved in the CREMAs.	*Is part of*		
Peer risk management	Community members foiling illegal activities of others to reduce or eliminate nature conservation threats.		*Is part of*	
Sustainable agriculture production	Agriculture programmes that integrate quality inputs supply and soil fertility interventions with livestock rearing to improve farmers' living conditions.			*Is part of*
Sustainable benefits	All socio-ecological benefits sustainably derived from the CREMAs; including their allocation to beneficiaries.	*Produces*	*Produces*	*Produces*
Sustainable NTFPs collection	Sustainable collection and processing of NTFPs to improve CREMA members' living conditions.			*Is part of*
Tourism development	Eco-tourism activities initiated to generate sustainable alternative income for CREMA members.			*Is part of*
Unsustainable nature exploitation	All socio-economic utilization activities of nature that unsustainably degrade the resources base.	*Is cause of*	*Is cause of*	*Is cause of*
Waterbody conservation	The importance attached to the conservation of waterbodies because of its utility and amenity values.	*Is part of*		

Definitions applied to the central domains in this study

The focus of all the three CREMAs was first to protect the natural resources and then leverage on that to promote the peoples' living conditions. The key focal resources are the plants, animals and water as

well as cultural resources of the landscape. There were no major differences in participants' responses on conservation objectives, risk management and socio-economic opportunities approaches.

The following are the shared meanings derived from interviews to define the three central domains. *Conservation objective*: The purposes of setting up CREMAs to promote nature conservation and to improve living standards of community members. *Risk management*: Mechanisms use to reduce or eliminate nature conservation threats in the CREMAs. *Sustainable economic opportunities*: The application of sustainable mechanisms to exploit natural resources to improve living standards of members.

Semantic interrelationships of labelled links to the central domains

Figure 1 is a semantic interrelationships developed from participants' responses for the three central domains. Statements below and similar ones show how the semantic linkages among conservation objectives, risk management and sustainable economic opportunities relatedness were derived.

> *A1: The objective of the project is to conserve plants and animals…we are also looking to lifting up the culture of the people. Again one of the objectives is to protect the water bodies by reducing threats against the resources and promote their linkages or influences on the tourism potentials and other sustainable development potentials of the area.*

> C1: *The objectives are to protect the CREMA resources and to raise the living standards of the citizens living in the various communities. For example through the CREMA we have alternative livelihood support for members in beekeeping and Shea nuts processing.*

The core objectives of the CREMAs were to protect natural resources by managing risks that threaten the resources. The leaders then leverage on their conservation success to promote alternative livelihoods to improve living standards of members. From figure 1, conservation objective *promotes* sustainable economic opportunities. However, the attainment of sustainable economic opportunities *is associated with* how the risks that threaten the resources are managed. Risk management importance in the CREMAs rests on its direct or remote *associations with* the other two central domains. A1 and C1 views indicated above show the CREMAs strive to manage threats by reducing illegal and unsustainable utilization practices to attain conservation objectives that *promote* sustainable economic opportunities.

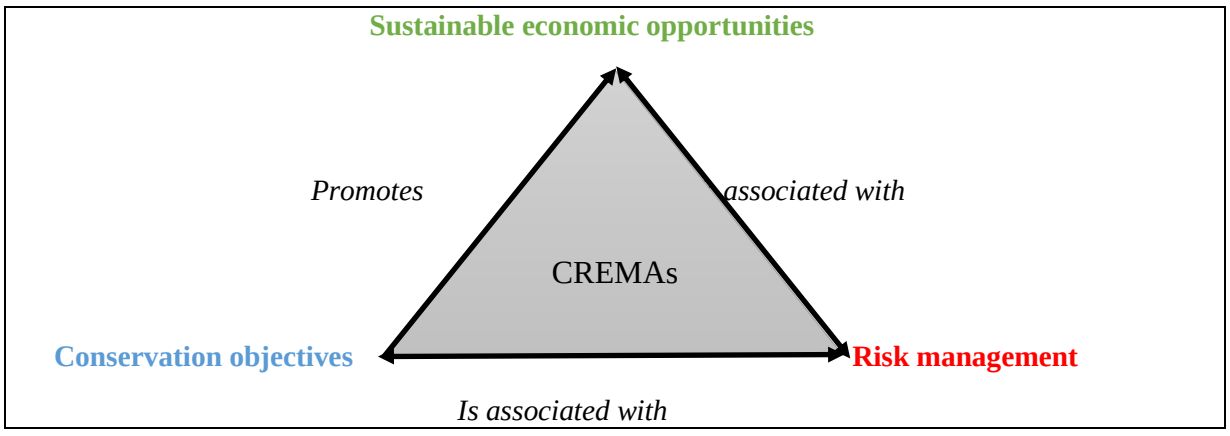

Figure 1. Semantic interrelationship among the three central domains

CREMA Conservation Objective and Its Themes Interrelationships

Conservation baseline data, nature conservation, waterbody conservation and cultural conservation were exclusive to conservation objective domain. CREMA objectives are promoted to achieve nature conservation principles that also improve living standards of community members. The conservation objectives of the WCHS, ZIWS and SKGK did not vary much as the major purpose was to conserve

unique flora and fauna species that occur on their communal lands and to leverage on them for socio-economic development.

Semantic interrelationships of conservation objective themes

The CREMA conservation objectives have both ecological and socio-economic themes. Unique flora and fauna resources found on the communal landscape are *associated with* abiotic resources like waterbodies and the cultural heritage of the people which together form *parts of* the objectives. See B3 and C3 statements.

> *C 3: The first objective is the conservation of the animals and plants… because where there are animals, the land is always fertile for farming activities… we do not only talk about animals; it is also about rivers or water, culture…The conservation of wildlife will bring the other economic benefits.*
>
> *B 3: The main objective is just to preserve the area. We want to protect both wild animals and plants. Also, we want to conserve the Black Volta which is an international River for Ghana and Burkina Faso…locally the fish and the River has cultural significance*.

The above statements and similar ones indicate the core objective of nature conservation is also *associated* with the culture of the people and waterbodies of the landscape.

The main *causal* themes that prompt the setting up of CREMAs are conservation baseline data, unsustainable nature exploitation and conservation motivation. The three *causal* themes give credence to the basis of establishing CREMAs. For example, C1 captured these essences. *'… the plants and animals or the environment was fast depleting…Surveys were conducted…. That is what brought us to the establishment of the SKGK …'.* Resources degradation is the main *cause* that prompt surveys to be conducted to get baseline data. The leaders use the established basis to formulate conservation objectives aim to *produce* sustainable benefits. Figure 2 shows conservation objectives and its themes placed logically to each other in a semantic interrelations.

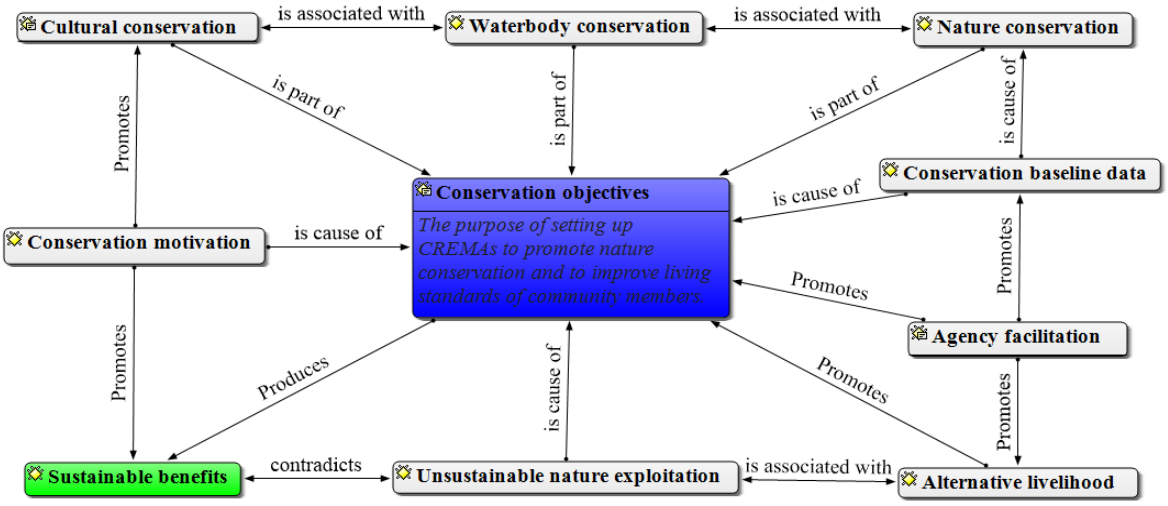

Figure 2. Conservation objective thematic interrelationships

There are themes like agency facilitation and alternative livelihood that *promote* the attainment of the CREMA objectives. External agencies mainly facilitate the initiation of socio-economic opportunities in the CREMAs. B 3's statement below shows the CREMAs tap into external agencies' support to promote socio-economic opportunities.

> *…we have realized we have tourism potential. We have the hippos,.. I have already written to the District Assembly to help tap our development potential. The Member of Parliament of the area has a copy and the UNDP/GEF programme also has a copy of our proposal*.

Risk Management and Its Themes' Interrelationships

Risk management are the mechanisms used to reduce or eliminate major conservation threats such as poaching, bushfires, illegal logging, and unsustainable agriculture in the CREMAs. Out of the eight themes that fell under this central domain, peer risk management and change in attitude were exclusive.

Semantic interrelationships of risk management themes

Figure 3 shows the semantic interrelationships of socio-ecological themes of the CREMAs.

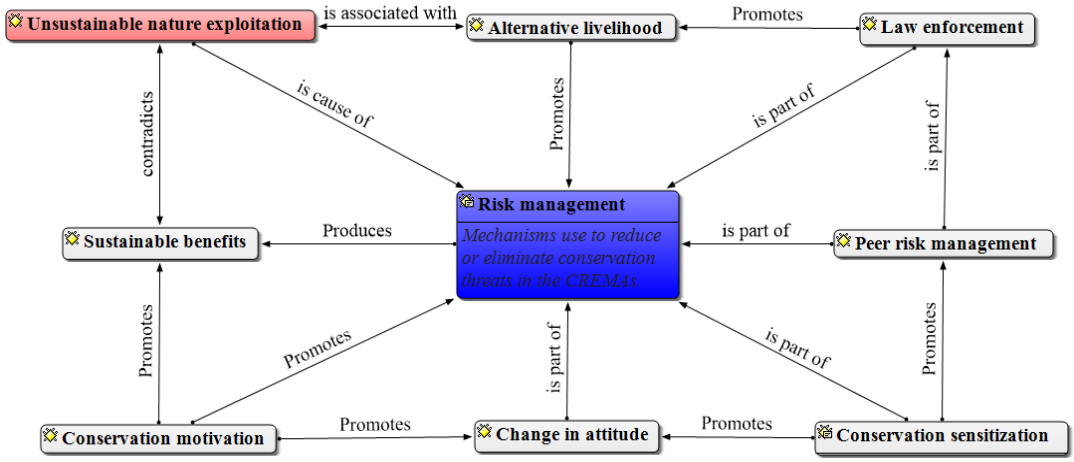

Figure 3: Risk management thematic interrelationships

The basis for risk management programmes in the CREMAs is to reduce illegal activities. The main *causal* theme under this domain is unsustainable nature exploitation. For example, A 2 mentioned; '*If it happens, I will stop my work and I believe most of the workers will stop too. That could be disastrous to our conservation objectives'*. The participant asserted to stop his work if the hippopotamus is poached; this is an indication to the conservation motivation for the species and also how its unsustainable utilization will *cause* the collapse of the conservation project.

Risk management is *promoted* by conservation motivation and alternative livelihood whereas change in attitude, law enforcement, conservation sensitization and peer risk management form *parts* of risk management activities in the semantic network.

A change to create a new sense of communal ownership and for community members to incorporate nature conservation as a legitimate land use in their farming activities *form* part of risk management. The main themes that *promote* change in attitude are conservation sensitization and conservation motivation. For example, C 2 stated: '*In the past you would see about five or six people will just come from somewhere on motorbikes and they joined those around to go hunting… It is not happening as it used to be since the CREMA was established'.* This statement infers the level of poaching has reduced from the previous levels.

Sustainable Economic Opportunities and Themes

Sustainable mechanisms are applied to exploit the natural and cultural resources of the CREMAs for socio-economic development. Sustainable economic opportunities had 11 themes and four were exclusive to the central domain. The exclusive themes were sustainable NTFPs collection, gender considerations, sustainable agriculture production and tourism development.

Semantic interrelationships of sustainable economic opportunities themes

Just as it is under risk management, unsustainable nature exploitation is the main *causal* theme under sustainable economic opportunities. That is, the aim to establishing viable nature based businesses is to *contradict* unsustainable nature exploitation practices. However, under sustainable economic

opportunities domain, alternative livelihood theme *is property of* the domain unlike under conservation objectives and risk management where it *promotes*. For example, B3 mentioned some alternative livelihood programmes that serve as sustainable economic opportunities created in ZIWS.

> *We also have small ruminants project with 48 people involved. We have beekeeping established for 40 people… We have a fast growing cassava plant supplied from Ministry of Food and Agriculture to selected farmers. The Gari-Tapioca women group process the cassava into gari (*local staple*). We also have batik-tie-dye group who make clothing for sale. We are again developing our tourism plan around the hippopotamus.*

Tourism development, sustainable agriculture production, gender considerations and sustainable NTFPs collection themes' strategies are initiated to form *parts of* sustainable economic opportunities. These programmes are pursued as major nature conservation and socio-economic development options. For example, gender considerations are enshrined in the constitutions with affirmative clauses to ensure women participation in CREMA activities with emphasis to promote their greater economic empowerment.

The rest of the themes under sustainable economic opportunities *promote* the attainment of the central domain and their connected themes. However, tourism development and sustainable agriculture *associates with* each other. That is, both sets of themes directly or remotely influence the successes of each other. For example, the number of tourists' visitations will have an impact on the kind and level of sales of food packages in the CREMA communities. In the same way, a successful implementation of eco-tourism activities would create new businesses and other job opportunities that could affect the number of people who would be engaged in agriculture. A 1's statement attest to this assertion.

> *… We have the tourism aspects which I will say is now fueling the conservation project. The money we get from tourism is used to protect the area. Through that we have employed staff such as rangers who are working for us to make sure human activities do not interfere….*

Noticeably, some community members are employed to be tour guards and rangers to respectively guide tourists and protect the conservation area against activities that are detrimental to the eco-tourism. The new employment and eco-tourism business opportunities limit the number of people who could have been farmers and also restrict areas that could have been put under cultivation; indicating the *associative* relationship between agriculture and eco-tourism. Figure 4 is the semantic networks for sustainable economic opportunities in the CREMAs.

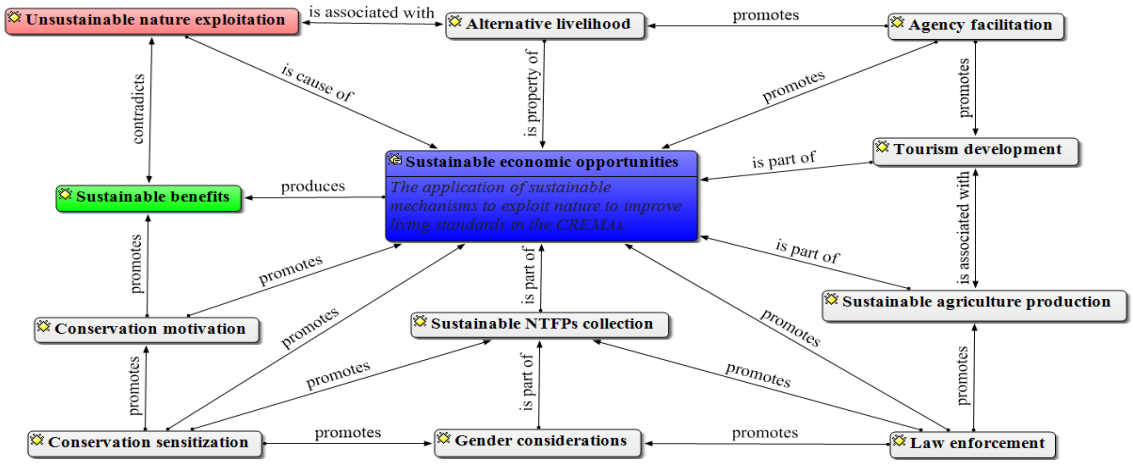

Figure 4. Sustainable economic opportunities thematic interrelationships

External agencies are really important in developing sustainable economic opportunities in the CREMAs. These agencies provide, for example, capital and machinery for processing NTFPs and they also support the communities to regenerate degraded lands or linked them to private sector investments to develop other businesses. Both governmental and non-governmental agencies *promote* sustainable

socio-economic opportunities by providing both technical and financial supports. See C 1 statement. '*With a help from the Wildlife Division, our communities have put up their Shea nut processing plants; it is left with Katiu and Kayoro although the machines have been brought'.*

Discussion and Conclusion

This study identified the CREMA landscape to have both ecological and social themes with intricate interrelationships that implementers have to understand. First, there are *causal* themes that prompt CREMA conservation activities. Nature conservation threats (Game et al., 2013) emanate from unsustainable exploitation which is the major *causal* theme, because it *contradicts* the determinations of sustainable benefits that are expected to be *produced* from implementing CREMA activities.

However, the ability to initiate successful nature conservation programmes that yield sustainable benefits depend on quality conservation baseline data that connect to the socio-economic demands of the people on the resources. To avoid collaborative nature conservation pitfalls (Agrawal & Gibson, 1999; Shafer, 2015), surveys are thus conducted first to understand the status and nature of utilization dynamic potentials to improve livelihoods (Bixler et al., 2015; Brooks et al., 2013). Such surveys are expensive to undertake and usually external agency facilitation is needed to collect quality data for CREMA establishment and its effective management.

There are also themes that form *parts* of the central domains (conservation objectives, risk management and sustainable economic opportunities) and some other related themes. An understanding of the interrelationships that exist among the themes that form *parts* of the three central domains and their related themes can better explain the socio-ecological functions (Agrawal & Gibson, 1999) of the resources. For example, the flora, fauna, waterbody and cultural resources of the CREMAs form *parts* of the conservation objectives and it is on the basis of their socio-ecological status and functions that alternative livelihood programmes which are aimed to bring effectiveness and efficiency to their utilization are initiated (Brooks et al., 2013). Some programmes like sustainable NTFPs collection, sustainable agriculture production, gender considerations and tourism development are initiated to form *parts* of sustainable economic opportunities. Implementing such programmes is contingent on available natural resources of the CREMA. However, the sustainable benefits to be derived will not thrive only on effective risk management strategies, but also on measures that encourage their just and fair allocation to the people (Agyare, 2013).

Five themes *promote* the achievement of the central domains. These encouraging themes; agency facilitation, alternative livelihood, conservation motivation, conservation sensitization and law enforcement are also crosscutting, transcending beyond one central domain. Apart from their encouraging roles in the achievement of the central domains, these themes also, under some interrelationships, encourage the achievement of other themes or they themselves are *promoted* by related themes. For example, alternative livelihood under risk management domain *promotes*, but the same theme is *promoted* by agency facilitation under conservation objective and sustainable economic opportunities. These intricate interrelationships among conservation themes to their central domains bring to the fore Lockwood et al. (2010) warning to the nature conservationists to consider addressing conservation issues at both temporal and spatial scales.

Ideas on how to achieve conservation objectives differ on the communal landscape. Shafer (2015) for example advocated for sole application of strict law enforcement whereas Geldmann et al. (2019) advised livelihood improvement programmes be combined with law enforcement. The findings of this study confirm an application of placating themes like livelihood incentives and creating awareness together with sanctions are the effective mechanisms to achieve sustainable benefits in the CREMAs.

The *promoting* themes interrelationships to both nature conservation objectives and socio-economic opportunities bring further understanding to CREMA establishment and management. For example, the CREMA leaders actively seek external agencies support to establish and implement CREMA programmes (Owusu-Ansah, 2020). Again, to secure the resource base upon which the alternative livelihood strategies are built, conservation sensitization and law enforcement strategies (Shafer, 2015)

which *promote* change in the local peoples' attitudes are initiated. The effectiveness of conservation sensitization and law enforcement strategies thrive on an understanding and appreciation of the *contradictory* effects that unsustainable exploitation have on the expected sustainable benefits to be *produced* from the CREMAs.

Additionally, law enforcement and conservation sensitization strategies *promote* sustainable economic opportunities unlike under risk management where they form *parts* of the central domain. Therefore these strategies are not only initiated to reduce or eliminate threats that degrade the resources, but also to change attitudes to secure the resource base of rural enterprises. Peer risk management was noticeably mentioned by all participants as an important indicator to effective risk management. The communities in the study sites can be characterized as having cultures of collectivism and masculinity; with a great power distance between males and females (Hofstede, 2001). The reported changes in attitudes and behaviours in the CREMAs is worth mentioning. That is, implementing CREMA activities have allowed members to now challenge unsustainable practices of others based on the expected equal and equitable collective shared benefits to members.

Gender considerations are mostly reserved for women's economic empowerment in the sustainable economic opportunities programmes. They are initiated to reduce the economic power distance relation between males and females (Hofstede, 2001). The economic power distance between males and females in the study sites is manifested in the control and access rights to natural resources; where women are disadvantaged (Laube, 2015). Ironically, women form the majority who depend on NTFPs collection and processing for livelihoods (Moore, 2008). Thus, affirmative clauses are enacted into CREMA constitutions to deliberately promote programmes that encourage women active participation in CREMA activities.

Conclusively, there are important intricate socio-ecological issues in the CREMA landscape which must be managed effectively to achieve conservation strategies planned to protect the landscape resources and also to promote rural livelihoods. The challenge to the CREMA managers is how to balance the application of both incentives and restrictive programmes (Bandoh, 2010) to fairly share sustainable benefits to members to avoid the disenchantments that occur in collaborative nature conservation (Agrawal & Gibson, 1999).

Study limitations

The study was undertaken in only three CREMAs and therefore interpretation and application of the findings to broader community conservation projects should be done with caution. Again, the findings were influenced by the experiences of the researcher in collaborative nature conservation. His experiences and those of the participants' influenced the shared meanings used to develop the semantic networks in line with Osorio-Forero et al.'s (2019) which admit experts' subjectivity in semantic networks development.

Recommendations

This study considers conservation education, law enforcement and livelihood programmes should be combined to effectively manage CREMAs unlike in the government protected areas where little livelihood incentives are provided. CREMA leaders should carefully incorporate law enforcement, conservation education with livelihood incentives to achieve sustainable nature conservation objectives.

CREMA managers have to work assiduously to change the local people attitudes towards the resources from the commons to a sense of communal ownership to promote effective risk management. 'Peer risk management' where community members challenge the unsustainable activities of others is the revolutionized attitudinal change on natural resources that managers should target in the CREMAs.

CREMA programmes that seek to promote economic empowerment of women should be pursued with finesse even as they aim to reduce economic power distance between males and females. That is to remove some cultural barriers that control women access to natural resources.

The findings of this study should be explored further because the CREMA model has the potential to enhance socio-economic opportunities to improve livelihoods of rural people by managing risks that threaten natural resource sustainability.

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Ethical approval

In the writing process of the study titled "**Applying socio-ecological perspectives semantic networks in managing community conservation areas in Ghana**", the rules of scientific, ethical and citation were followed; it was undertaken by the authors of this study that no falsification was made on the collected data, "Journal Action Qualitative & Mixed Methods Research [JAQMER] and Editor" had no responsibility for all ethical violations to be faced, and all responsibility belongs to the authors and that the study was not submitted for evaluation to any other academic publishing environment.

Ethics committee approval

The study design was approved by the Dissertation Review Board (SMC University Prospectus Review, 3/10/2017) of Swiss Management Center University.

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Exploring the potential of play-based learning interventions for academic success: An action research project on improving preschool students' number mastery

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Abstract. This action research project aimed to improve preschool students' number fluency through a six-week play-based learning intervention. The study collected data from students' GOLD assessment checkpoints and weekly formative assessments. The results showed a significant increase in students' number mastery (1-10 counting) from 40% to 60%, with even higher progress for those going into kindergarten on counting 1-20. The findings suggest that students of all backgrounds, including Special Education and ELL students, can achieve academic success with the right learning environment. The study highlights the potential of play-based learning interventions for enhancing early childhood education.

Keywords: Play-based learning, number fluency, number mastery, preschool

Introduction

The development of number fluency, which refers to the ability to understand and manipulate numbers effortlessly, is widely recognized as a pivotal aspect of early childhood education (Dehaene, 2011). It serves as a fundamental building block upon which various mathematical concepts and skills are constructed, thus laying the groundwork for future academic accomplishments. This significance is magnified in the context of rural public schools, where resource constraints often present challenges to delivering comprehensive educational experiences. Moreover, the diverse array of learning styles and cognitive capabilities within the student population further underscores the importance of nurturing strong number fluency.

In this study, a preschool teacher, also the lead author, embarked on an individualized action research endeavor to enhance the number fluency of her young learners. This undertaking was imbued with a strategic emphasis on two key components: firstly, the adept recognition of numbers, and secondly, the proficient ability to write numbers up to 20. The rationale behind this research stemmed from the belief that a solid grasp of number recognition and writing skills at an early stage could pave the way for greater mathematical competence in subsequent years.

Extensive literature highlights the critical role of early numeracy skills in children's mathematical development. A consensus among researchers, such as Clements and Sarama (2009), indicates that early number competency serves as a foundational pillar for later mathematical achievement. Empirical

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evidence by Duncan et al. (2020) further corroborates that early numerical knowledge is a significant predictor of later mathematical success, even after controlling for other cognitive factors and background variables. This is supported by the work of Ghazali (2020), who found that children who begin elementary school with a firm understanding of numbers and their meanings are better equipped to tackle more complex mathematical concepts. Moreover, studies by Borah (2022) and Ginsburg (2021) suggest that the ability to recognize and write numbers accurately is not merely a rote skill but is indicative of a child's understanding of number concepts and place value. The approach of this action research is also rooted in Vygotsky's social constructivist theory (Vygotsky, 1978), where the scaffolding of number writing and recognition is considered as a social process that can be enhanced through interaction with more knowledgeable others.

In light of this theoretical and empirical background, the action research undertaken by the preschool teacher aims to contribute to the field by not only enhancing pedagogical practice but also by providing further evidence of the long-term benefits of early number fluency. Through methodical observation and intervention, this study seeks to bridge the gap between theory and practice, thus enriching the academic discourse with practical insights into the development of number fluency in early childhood education.

Method and paradigm of research

According to Bennett et al. (2022), action research is an investigative method in which classroom teachers assess and enhance their teaching strategies to tackle specific issues in their classrooms. This method centers on identifying a particular problem, allowing the teacher to assume the role of a researcher and devise measures based on their discoveries. It is a rigorous inquiry process that bridges the gap between theory and practice, fostering critical thinking and results-based decision-making. Walker and Vu (2023) observed that many schools in the US have recently adopted the practice of incorporating teacher action research into the evaluation process to enable educators to take charge of their professional growth while learning from their colleagues' successes and struggles in the classroom.

As action research is concerned with change and participation and emancipation, mainly three paradigms of radical structuralist, interpretive and radical humanist in guiding action research. The interpretive paradigm is based on the fact that reality is created as a result of interpersonal interaction through talking-discussion -understanding- reconciliation. This paradigm based on anti-positivism and hermeneutic/practical interest guides action researchers especially in participatory and emancipatory action research due to being participatory and democratic as practitioner is involved as partners with expertise, not as subordinates (Burrell & Morgan, 1979; Gunbayi, 2020a). Thus this action research is guided by participatory action research based on interpretive paradigm as participatory action research which aims to improve effectiveness as well as enhancing the practitioner's understanding and professional development (encouraging practitioner practical deliberation and self-reflection) (Gunbayi, 2020b) and similarly play-based learning is a child-centered approach that focuses on the child's interests, needs, and abilities, while also recognizing the importance of play in child development.

In conducting this action research, a multifaceted approach was adopted. Various instructional methods and pedagogical techniques were explored to cater to the diverse learning needs of the preschool students. Through careful observation and ongoing assessment, the teacher gauged each student's individual progress, thereby tailoring the strategies to align with their developmental trajectories. Interactive and engaging activities were designed to not only make learning enjoyable but also to stimulate cognitive growth. These activities ranged from numeral-based games and exercises to creative tasks that encouraged the integration of numbers into everyday experiences. The research was underpinned by a cyclical process of planning, action, observation, and reflection. Periodic data collection enabled the teacher to track advancements, discern trends, and refine strategies accordingly. This iterative approach empowered her to continually adapt to the evolving needs of her students, thereby fostering a dynamic and responsive learning environment. In this particular action research project, the classroom teacher aimed to help develop her preschool students' number fluency through a

play- based learning intervention. Play-based learning, often used in early childhood education settings, is a teaching approach that involves using play as a means of educating young children. It is a child-centered approach that focuses on the child's interests, needs, and abilities, while also recognizing the importance of play in child development. Play-based learning encourages children to explore, experiment, and discover new things in a fun and safe environment.

Sampling

The curriculum and intervention programs used in the classroom have primarily focused on language and literature, with math activities integrated based on what is being covered in class. The Teaching Strategies GOLD assessment tool, which monitors the progress of children in key domains of learning, has shown that math and numbers are a lower area for all of her students. According to the GOLD guidelines, preschool students should be able to identify numbers up to 10 by the time they enter kindergarten, with a goal of identifying numbers through 20 for a solid foundation going into kindergarten. However, at the February checkpoint, only 46% of her students could identify numbers up to 10. Those students who were returning for another year all struggled with identifying numbers up to 6. As a dedicated teacher, she wanted to build a solid foundation on numbers for them so that they can carry that over to next year where they can add to their knowledge base. With that in mind, she started an individual action research project to help develop her students' number fluency

Researcher characteristics

The teacher, also the lead researcher of this project, has been teaching preschool at a rural public school in the Midwest in the US for five years, with 25 students ranging from age 3-5 years old split between two classes. Some of these students are in their first year of school and others are getting ready to go to kindergarten next year. Within these two classes, 07 students receive special education services, 01 is an EL student, and 02 are behavior students. According to the teacher, her students bring a wide range of learning styles and cognitive abilities to the classroom, with a lot of differentiation happening through large group, small group, and individual support.

Intervention and data collection

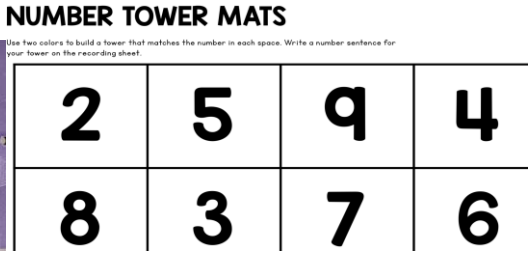
Data collected for this study included two main sources. The first source was from students' GOLD assessment checkpoint before and after the 06-week play- based learning intervention. The second source was formative assessment of students' weekly progress. At the beginning of the intervention process between both the morning and afternoon classes, the teacher had 39% of her students not able to identify numbers to 10. She started to implement these interventions a week after she had collected all of the students' data pulled from GOLD. She did small group interventions 03 times a week during center time. Midway through this 06 week intervention she did a quick individual skills check to see where the students were at and if she needed to make changes to what she was doing.

The play- based learning intervention was designed to encourage children to engage in mathematical learning through playful exploration and application of concepts in a variety of contexts. To start, in whole group learning especially during calendar time, the teacher got students to talk more about the number of the month, and numbers on the calendar. To line up for lunch, she had them come up and write a number she told them on the whiteboard. When lining up for breakfast and lunch she would write a number on their dots and tell them to find that dot to line up on. According to the teacher, adding little things into their day would benefit along with small group skills groups because children engage in spontaneous exploration and application of mathematical concepts in their daily activities and play, well before they start attending school. Moreover, their understanding of mathematics can be intricate and advanced. She also put math manipulatives into their center areas, as well as the sensory bin because research shows that young children learn best through play, so adding in math-based manipulatives and letting them explore is a great benefit for them.

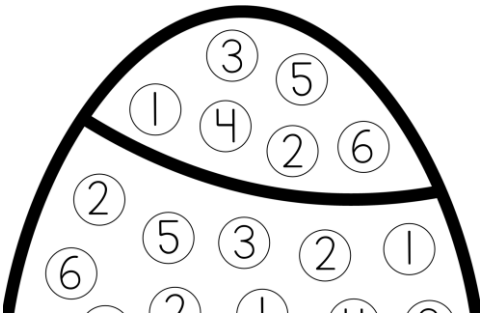
For small groups, she looked at her beginning data and split them into groups based on where they were at in GOLD. The teacher tried to pull each group 2-3 times a week depending on the needs of the students. The activities that they did within these groups range based on cognitive ability. For her lower groups they started out simple just by talking about the numbers and matching and continued to build on those skills. The higher ability groups would play dice games. She had a higher skills group that worked on writing our numbers. During this time she would not only use paper pencil but, make it more fun by using shaving cream, paint, sugar… etc. to practice writing numbers. This group was pulled 1 to 2 times a week.

During the 06-week intervention, two of the days were number identification activities. The activities were different each day, and oftentimes were repeated throughout the 06 weeks. Some of these activities included flipping a playing card and finding that number on the paper and coloring it in. Another activity was counting the number of dots on a card and identifying the number and placing a clothespin on that number. For students that needed more practice they would do activities on just matching numbers. The teacher had a few job boxes where they would match the number on a stick and place it in the hole that was labeled with that number, or just simply match the number. Below are a few examples of the interventions.

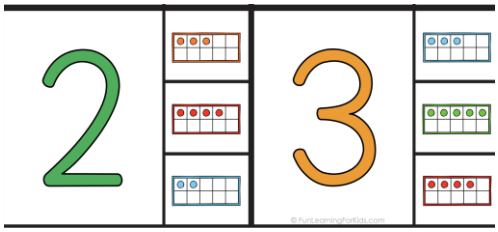
Match and say the number



Build the number with unifix cubes



Draw a playing card and color the number



One example of a number clip card

Figure 1. *A few examples of the interventions*

On fun Friday, students got to pick groups and they would play a game. A lot of her students did not play board games at home and she wanted a fun way of learning for students, not only were they working on number identification, but they also worked on turn taking, and social skills. Games that were played were, UNO, Hi Ho Cherry-O, Matching Game, and Shots and Ladders.

Ethical procedures

Scientific research ethics were followed at all stages of the research. A review board approval of the research was obtained from the University's Institutional Review Board (IRB Approval Number: 091421-1) before the project started.

Rigor

The followings were carried out to increase the rigor of our research. The study's internal validity or credibility is vigiourous, attributed to the use of the GOLD assessment checkpoints, which provided a comparative measure of student capabilities pre-and-post the six-week intervention. Additionally, the credibility is enhanced by the integration of formative assessments, offering a dynamic view of student development on a weekly basis. While these rigorous methods underpin the study's internal rigor, the external validity, or transferability, may be somewhat constrained due to the nature of action research invloving a specific educational context and demographic. However, the comprehensive documentation and transparency of the intervention steps lend themselves to potential adaptation and application in similar settings, facilitating a degree of transferability. The research's internal reliability or confirmability is exemplified by the uniformity and systematic approach in data collection, as well as the teacher's meticulous observations. The adaptability in the instructional approach, informed by ongoing assessments, illustrates a commitment to tailoring educational strategies to meet the evolving needs of students, which also supports the external reliability or dependability of the research. This structured yet flexible methodology suggests that the findings could be replicated and are dependable across similar educational scenarios, assuming similar conditions and constraints (Maxwell, 2012; Morris & Paris, 2022)

Findings

Data collected for this study included two main sources. The first source was from students' GOLD assessment checkpoint before and after the 06-week play- based learning intervention. The second source was formative assessment of students' weekly progress. At the beginning of the intervention process between both the morning and afternoon classes, the teacher had 39% of her students not able to identify numbers to 10. She started to implement these interventions a week after she had collected all of the students' data pulled from GOLD. She did small group interventions 03 times a week during center time. Midway through this 06 week intervention she did a quick individual skills check to see where the students were at and if she needed to make changes to what she was doing.

During the 06-week intervention, the teacher also collected data weekly to see the progress the students were making. She took notes on her students' progress and also kept notes on students who were still struggling, so if she needed to change up her groups she could do that. During the 06 weeks, she changed groups up twice, once 02 weeks in and then again about 02 weeks later. Once it was time for a skill check, she would pull the students individually and do a quick skills assessment using flash cards. She would then mark down on their individual student skills paper and upload that into GOLD for the checkpoint. When she updated each student's assessment paper she liked to use different colors for each checkpoint so she could compare to where they were previously.

The results showed a significant increase in number mastery (counting 1-10) from 40% to 60% after the play-based learning intervention. This increase was particularly notable for students entering kindergarten, who showed a high level of improvement in counting up to 20. Figure 2 below provides a summary of the data.

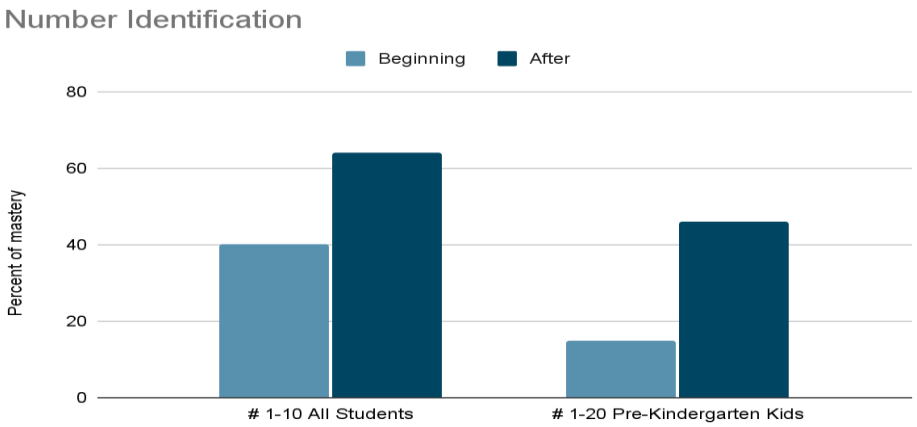


Figure 2. *Students' progress before and after the intervention*

Discussion and Reflection

According to the teacher, even before delving into the data analysis, it became evident that significant strides were being taken in the realm of skill development, even prior to conducting formal skills assessments. From observing her students in various classroom activities, the teacher stated it was apparent that their levels of confidence were steadily increasing, especially when tasked with identifying numbers within diverse contexts.

However, it was only when she conducted individual skills assessments on each student and meticulously gathered official data that she was able to gain a comprehensive understanding of the true efficacy of the interventions implemented. At the outset of the intervention process, a mere 39% of her students displayed the ability to identify numbers ranging from 1 to 10.

A closer examination of the data presented in Figure 2 underscores the remarkable transformation achieved over the course of the 06- week intervention period. The numbers speak volumes: following the completion of the intervention, a significant 64% of her students demonstrated proficiency in identifying numbers within the 1 to 10 range. This increase in success rates is a testament to the effectiveness of the intervention strategies employed.

What stands out most impressively from this progress is the notable advancements achieved by her students who are on the brink of entering kindergarten. At the initiation of the 06- week intervention period, this subgroup exhibited a mere 20% proficiency in identifying numbers up to 20. By the conclusion of the intervention, this percentage more than doubled, with an encouraging 45% of these students showcasing the ability to identify numbers up to 20.

While this may not represent a majority, it is crucial to recognize the context in which this progress was achieved. Given the baseline data from the commencement of the academic year, the strides made are undoubtedly substantial. This transformative journey highlights the power of targeted interventions and their potential to drive significant enhancements in students' skill acquisition and overall learning trajectory.

When analyzing the data pertaining to students who are slated to return for an additional year of preschool, it becomes evident that they possess a solid foundational grasp of number identification. This proficiency allows them to confidently recognize numbers up to 20 even before entering kindergarten. Given the continuity of the educational intervention, the teacher hold the conviction that their progress would continue to flourish, culminating in further advancements by the culmination of the school year—a mere 6½ weeks away.

The findings extracted from this project yield a resounding affirmation: all students possess an innate capacity for learning, irrespective of their classification as Special Education, English Language Learners (ELL), or typical learners. This assertion underscores the pivotal role played by an appropriate and conducive learning environment. Yet, amidst these encouraging outcomes, a paramount inquiry persists: how can a teacher facilitate a higher level of consistency in students who are grappling with or intermittently struggling with number identification?

The persistent challenge presents itself with three kindergarten-bound students—two duly identified as Developmentally Delayed (DD) and one categorized as having Specific Language Impairment (SLI). Despite diligently incorporating an array of interventions and daily number identification activities since the inception of the academic year, the proficiency gap remains unresolved for these three individuals. In light of this predicament, a potential avenue emerges: deconstructing the learning process into more elementary interventions. These interventions could be administered on an individual basis or within the context of a partnership with a peer possessing a heightened aptitude.

Implications

The implications derived from the findings of this action research project hold significant potential for shaping and enhancing the landscape of early childhood education in multifaceted ways:

- Effective Integration of Play-Based Learning: The study's revelation of the efficacy of play-based learning interventions in bolstering preschool students' number fluency underscores a paradigm shift in pedagogical practices. Educators should strategically embed play-based activities into their curriculum, utilizing toys, games, and interactive experiences that foster a deep understanding of mathematical concepts. This approach not only engages young learners but also establishes a strong foundation for future academic achievements.

- Empowerment through Formative Assessment: The study's emphasis on formative assessment as a tool for real-time monitoring of student progress offers educators a blueprint for cultivating personalized learning pathways. Regular assessment and timely feedback enable educators to identify students' strengths and areas needing improvement, allowing for adjustments in instruction methods. This dynamic process empowers educators to cater to each student's unique learning trajectory, leading to more substantial educational growth.

- Inclusivity and Equitable Education: The study's identification of the potential for academic success across diverse student backgrounds emphasizes the paramount importance of inclusive and equitable education. Educators are encouraged to create a classroom environment that accommodates learners with varying needs, ensuring that students with disabilities, special education requirements, or English Language Learners (ELL) receive the necessary support to thrive. This approach not only enriches the learning experience but also promotes a culture of respect and understanding among students.

- Tangible Learning through Manipulatives: The study's endorsement of the efficacy of manipulatives and hands-on materials as tools for conceptual exploration represents a reimagining of teaching methodologies. Educators are prompted to supply students with a myriad of tactile materials that foster active learning. Through tactile engagement, children can grasp abstract mathematical ideas more concretely, promoting a deeper understanding and retention of concepts.

- Customized Learning through Small Group Instruction: The study's recognition of the value of small group instruction as a means to facilitate preschool students' academic achievement reinforces the significance of tailored education. Educators should establish small-group settings where personalized instruction can occur. Such an approach permits educators to identify individual needs and design targeted interventions that address specific learning gaps, ensuring that each child receives the guidance they require for optimal growth.

In essence, these implications collectively advocate for a transformation in early childhood education that embraces dynamic teaching strategies, inclusivity, assessment-driven adaptations, and a renewed focus on practical engagement. The research encourages educators to adopt a multifaceted approach that fosters holistic growth, acknowledging the unique attributes of each learner and preparing them for a future marked by academic prowess and personal enrichment.

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Ethical approval

In the writing process of the study titled "**Exploring the potential of play-based learning interventions for academic success: An action research project on improving preschool students' number mastery**", the rules of scientific, ethical and citation were followed; it was undertaken by the authors of this study that no falsification was made on the collected data, "Journal Action Qualitative & Mixed Methods Research [JAQMER] and Editor" had no responsibility for all ethical violations to be faced, and all responsibility belongs to the authors and that the study was not submitted for evaluation to any other academic publishing environment.

Ethics committee approval

A review board approval of the research before the project started was obtained from the University's Institutional Review Board (IRB Approval Number: 091421-1).

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Students, teachers and principals' views on the effects of school gyms on functioning of school

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Abstract. In this study, the views of students, teachers, and principals on the effects of gyms in schools on functioning of school were sought. The research is based on views of principals and teachers working in schools with gyms in Manavgat during the 2021-2022 academic year and students studying in these schools. The research was designed in qualitative descriptive phenomenology. Semi-structured interview forms were used to collect the research data. According to the findings of the research, it can be said that the school principal, students, and teachers had a positive perception of the gym in schools. In line with the results, it was suggested that all schools affiliated with the Ministry of National Education should have gyms and that the physical capacity of the gyms in these schools should be increased.

Keywords: School gyms, students, principals, teachers

Introduction

The importance of sports and physical education courses in our lives is quite wide. The most important benefit of sports and physical education courses in our lives is physical health. Sports and physical education play an important role in maintaining and improving our physical health. Exercising regularly supports muscle and bone health, increases cardiovascular endurance, and reduces the risk of many chronic diseases such as obesity, heart disease, and diabetes. It also contributes to the development of basic physical abilities such as mobility, flexibility and balance. At the same time, sports and physical education have positive effects on our mental health. Exercising reduces stress, improves mood, and helps prevent mental health problems such as depression and anxiety In addition, sports activities increase self-confidence, improve self-discipline, and improve learning capacity and cognitive functions (Bailey, 2004; Kılıç, 2015).

People who do sports not only grow socially, but also have more positive effects socially and mentally, as well as physical and mental benefits. Bad habits are the biggest problem for individuals and parents today, but doing sports creates a protective shield by preventing the formation of bad habits (Erbaş, Göral, & Kalemoğlu 2016).Today's popular sports are considered divided into social, mental, physical and material areas. Additionally, while sports positively affect people's emotional states, they also contribute to their physical development Doing sports helps the person to see the limit of what they can do, to recognize their essence and to do something by revealing their talents and creative areas with this definition. Without discriminating as a person or a team, doing sports helps interaction between individuals by reaching team spirit in teamwork. By multiplying their friendship areas, people who are in harmony with life together can thus be together. They can use their free time as effectively and efficiently as possible and help them develop in many other areas. The desire to win in sports is more of a balancing act than a bad competition. While this positive competitive environment has a positive effect on people's lives, it plays a positive role in the interaction between people by reducing the limitless wants

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and desires in their social environment. (Karataş, 2019). In addition to all these, since sports are universal, doing sports will teach people to be respectful, loving and understanding in response to people living in different geographies by changing the perspective of individuals and changing their perspectives

Sports contribute to the development of social skills through team games and group activities. Team sports help to acquire skills such as collaboration, leadership, communication, and problem-solving. In addition, sporting events and competitions encourage the formation of friendships between people and strengthen social relationships. In addition, sports and physical education teach discipline and the discipline of learning. Sports activities require regular training and preparation (Yaylacı, 2007). This provides students with important skills such as time management, responsibility, and goal setting. At the same time, sport emphasizes the importance of working for success, accepting failures, and continuous improvement. Therefore physical education in schools is useful for adopting a healthy lifestyle and staying active throughout life. These classes teach students the importance of playing sports and incorporating physical activity into their daily routine, helping them to lead a healthy life in the future (Arıcı, 2004). Thus, the importance of sports and physical education courses in our lives is of importance as doing sports supports our physical and mental health, contributes to our social and skill development, teaches discipline and learning discipline, and ensures the formation of healthy lifestyle habits.

In the study, it was aimed to interpret the views of principals, teachers and students on the effects of gyms in schools affiliated to the Ministry of National Education on students, teachers, principals and the general functioning of the school. In addition, it is important to understand the views of students, teachers and principals who have a gym in their school regarding the effects of the gym on students, teachers, principals and the general functioning of the school, to understand how the gyms are perceived by the students, teachers and principals who use them, and to reveal the benefits of the gyms by the users.

The problem statement and sub-problems of the research were expressed as follows:

Problem Statement

What are students, teachers and principals' views on the effects of gyms in schools on functioning of the school?

Sub-Problems:

1. What are students, teachers and principals' views on gyms?
2. What are students, teachers and principals' views on the effect of teaching the physical education course in the gyms on the efficiency of the course?
3. What are students, teachers and principals' views on the effect of the use of gyms in terms students' behaviors on the courses other than physical education class?
4. What are the principals' positive or negative views on the attitudes and behaviors of the students who use the gym?
5. What are students, teachers and principals' views on the effect of gyms on school success?
6. What are students, teachers and principals' suggestions for more efficient use of gyms?

Methodology

Method and paradigm of research

The research was qualitative and a descriptive phenomenology design was used in the research. Qualitative research is a method that analyzes research questions with an interpretive approach (Lincoln

& Guba, 1985, Gunbayi & Sorm, 2018). Each phenomenon or event that is the subject of the study is in its own context and the meanings that people attribute to them are interpreted. Thus, the aim of the phenomenological study is to find out the essence of participants' perception of lived experiences (Creswell, 1998; Patton, 1990).

Sampling

The population of the study consisted of 7 principals and 230 teachers working in schools with gyms in Antalya Manavgat and 3435 students studying in these schools. The sample of the study consisted of 4 principals, 6 teachers (3 Physical Education teachers and 3 teachers in different branches) and 9 students selected by convenient sampling, (Table 1.)

Table 1. Information about principal and teacher participants

Participant	Age	Gender	Branch	School of Work
P1	45	Male	Manager	High school
P2	40	Male	Manager	High school
P3	37	Male	Manager	High school
P4	49	Woman	Manager	High school
T1	40	Male	Science	High school
T2	32	Woman	Visual Arts	High school
T3	30	Male	Math	High school
T4	39	Woman	Physical education	High school
T5	42	Male	Physical education	High school
T6	45	Male	Physical education	High school

Data collection

The study data were obtained by using the semi-structured interview form, which was finalized after the pilot interviews, and a theoretical framework created based on the literature review. With semi-structured interview forms, the views of principals and subject teachers working in high schools and the students on the effects of school gyms on functioning of the school were recorded with interviews conducted with 30-45 minute interviews in order to find answers to sub-problems.

Ethics statement

Ethics Committee Approval of this research was obtained from Akdeniz University Social Sciences Ethics Committee at the meeting of 15 decision numbered 312 on September 8th, 2022, formal permission was obtained from the Antalya Provincial Directorate of National Education for the research numbered E-98057890-605.01-61022341 on October 17th, 2022, an informed consent form was obtained from the participants before the interview and participants were informed that their names would not be mentioned and be given the alphabetical codes for principals as P1, P2, P3, P4, for teachers as T1, T2, T3, T4, T5,T6 and for students S1, S2, S3, S4, S5, S6, S7, S8 and S9.

Rigour

In order to get validity and reliability criteria of a qualitative research, it is considered appropriate to use internal validity (credibility), external validity (transferability) and inner reliability (confirmability) and outer reliability (dependability) criteria (Lincoln & Guba , 1985). In order to ensure the internal validity of the study, semi-structured interview form was finalized after the pilot interviews and a theoretical framework of the interview form was created based on the literature review. In order to ensure the external validity (transferability) analytical generalization was made to a theory in discussion. In order to increase the internal reliability (dependability) of the research, all of the findings was given without comment. In addition, the consistency rate (Kappa Value) was calculated as .083, almost perfect

agreement by comparing the codes by the researcher and a second person (Landis and Koch 1977). In order to increase the external reliability (dependability) of the research, the researchers ensured to present on demand all the data collection tools, raw data, coding during the analysis phase, and the perceptions, notes, writings and inferences that form the basis of the report to an expert other than the project team (Lincoln & Guba, 1985; Gunbayi, 2018).

Data analysis

In the study, descriptive analysis was carried out, the results were presented with a descriptive manner and verbatim quotations were included, the findings obtained within the framework of the emerging themes and patterns were classified in line with the research objectives by using a qualitative software Nvivo 10 (Kelle, 1995; Cohen, Mannion, & Morrison, 2007).

Findings

1. Students, teachers and principals' views on gyms

The statements by the participants on gyms were examined according to school principals, students and teachers. All of the statements of principals were positive (f=4), the statements of eight of the students were positive (f=8) but one was negative (f=1) and the statements of five of the teachers were positive (f=5) but one was negative (f=1).

The views of some of the principal participants are given below:

> *I think gyms are extremely important for education. I think sports are essential for raising healthy generations. In this case, I think that the presence of gyms in schools will have a positive effect (P3).*
>
> *I think there should be gyms in every school, even in every neighborhood. Especially in the basic education section, the benefit of gyms is very clearly seen (P4).*

The views of some of the student participants are given below:

> *It's a social place, a space where you can show off your talents. We are able to show most of our talents in the gym, my perception of the gym is positive (S4).*
>
> *It is much better for us to have a gym, because as a science high school student, our classes are predominant. Therefore, we need places and spaces where we need to relieve stress. Therefore, we can use it effectively in gyms. That's my perception, it's good.(S7)*
>
> *The presence of gyms in schools also increases the contribution of students to their courses. Because we can go and socialize with our friends in our free time, we can attend courses better with a relaxed head because we socialize (S9).*

The views of some of the teacher participants are given below:

> *Of course, gyms have a positive perception for us teachers, especially in schools, as they offer a fun learning environment and as a result, they provide efficient learning (T1).*
>
> *In schools with gyms, gyms are very valuable in terms of children's development and the diversity of their physical activities. Unfortunately, there are very few gyms in our district, I think that schools with halls and gyms are very lucky, I think it is beneficial for the development of children (T4).*

My thoughts towards gyms are positive. In fact, I believe that every school should have gyms as much as possible, starting from kindergarten. ...In addition, public gyms should be built in certain areas in the neighborhoods, where children can discover themselves, young people can do sports and relax, and people who are close to the point of being old can do sports in terms of exercising their bodies and there should be a gym that can be in the neighborhoods. Yes, the cost is very high, but let's say I think it is thought that two or three can be done on the basis of our district (T6).

When participants' views on gyms were examined in general, it can be said that almost all of the participants had positive views about the gym. It was found that only one student and one teacher had negative views on gyms.

2. The effect of teaching the physical education course in the gyms on the efficiency of the course

The statements by the participants on the effect of teaching the physical education course in the gyms on the efficiency of the course were analyzed according to principals, students and teachers. All of the statements of principals (f=4), students (f=9) and teachers (f=6) were positive.

The views of some of the principal participants are given below:

Physical education courses are taught more easily in gyms, students' motivation becomes more efficient, and the perception that many sports trainings are carried out in different branches according to the capacity of the hall is revealed (P1).

It is a 100% efficient area because our physical education teachers carry out the course work they do for our students during their courses by using our halls at the maximum level, so I think it increases productivity by 100% (P2).

The views of some of the student participants are given below:

Thanks to the hall, we develop our skills and try to take them to the top. Thanks to our teacher, he helps us (S4).

Since almost all kinds of sports equipment are materials and equipment in gyms, it benefits us both as a place to do the desired sports in physical education class and in terms of avoiding weather events, which indoor gyms provide. And for its efficiency, we can easily do the sport we want because it has all kinds of tools (S7).

Of course, as with any course, if we are studying biology, if a biology laboratory is required, then a gym is mandatory for physical education. From my point of view, this allows us to use it better and more effectively for physical education and to deal with various areas. Since the gym gives enough space, it is processed more easily and effectively. (S8).

The views of some of the teacher participants are given below:

Especially in unfavorable weather conditions, the presence of a gym provides convenience to us in terms of Physical Education course. In addition, having team branches such as volleyball and basketball in the gym provides an additional advantage for us. At the same time, I think that when students study in the gym, they are better motivated and more productive (T1).

I think it's a really good thing in terms of putting the theoretical training in the physical education class into practice, and I see gyms as a place where talents emerge (T5).

Of course, having a hall is a big advantage. Our materials are ready, our lines are ready, there are all kinds of conveniences. It's much easier to get kids motivated (T6).

When participants' views on the effect of teaching the physical education course in the gyms on the efficiency of the course were examined in general, it was found that all of the participants had positive views on the effect of teaching the physical education course in the gyms on the efficiency of the course.

3. The effect of the use of gyms in terms students' behaviors on the courses other than physical education class

The statements by the participants on the effect of the use of gyms in terms students' behaviors on the courses other than physical education class were examined according to principals, students and teachers. All of the statements of principals were positive (f=4), the statements of five of the students were positive (f=5) but four negative (f=4) and all of the statements of teachers were positive (f =6).

The views of some of the principal participants are given below.

> *As I just mentioned, our other teachers also do other activities in the hall in addition to physical education courses in my classes. They also receive positive feedback from our children from these activities. When we look at the characteristics of our school and the characteristics of our students, we also use our hall for our children's social activities, entertainment and games. Therefore, we always receive positive feedback in our hall. There is no negativity (P2).*
>
> *In this regard, the use of gyms by our students both in physical education classes and in free hours prevents our students from some negative behaviors. Since they give their energy to sports, we can prevent some bad habits in this regard. At the same time, I think that there is a different motivation in other classes after the activity held there during the day (P3).*

The positive views of some of the student participants are given below.

> *It's nice when we use the gym outside of class, it relieves our boredom and I find it positive in this respect (S5).*
>
> *On the positive side, if you're the user, you can spend your time fun and useful in any way you want (S7).*

The negative view of one of the student participants is given below.

> *They're causing discomfort by misusing the hall. Sometimes there is a lot of noise, they hit the basketball inside, even though it is forbidden. They can cause some discomfort when we don't have a teacher, but they can't do that when there is a teacher (S4).*

The views of some of the teacher participants are given below.

> *If you ask as all schools, of course, it reflects positively, because our children cannot use their energy at home because our age is the age of technology. At least in physical education classes, we try to get rid of them a little bit so that our children can move at least a little bit and become aware of their skills (T3).*
>
> *After teaching the physical education course in the gym, our students have the chance to learn and play more comfortably in the gym, of course, so when they enter other classes, they put us in an advantageous situation and make our students ready to learn (T4).*
>
> *So friends have positive thoughts. Our children who play sports are more successful, more respectful, and feel more connected to the school (T6).*

When participants' views on the effect of the use of gyms in terms students' behaviors on the courses other than physical education class were examined, all of the principals and teachers stated that the students' use of the gym had a positive effect on student behavior. But while five of the students said

that the students' use of the gym had a positive effect on student behavior, four of them said that it reflected negatively on student behavior.

4. Positive or negative views on the attitudes and behaviors of the students who used the gym

The statements by the participants on positive or negative views on the attitudes and behaviors of the students who used the gym were examined according to principals, students and teachers. All of the statements of principals were positive (f=4) the statements of seven of the students were positive (f=7) but three negative (f=3) and the statements of teachers were three positive (f=3) and three negative (f=3).

The views of some of the principal participants are given below.

> *The development of sports awareness in the students who use the gyms makes an important contribution to the school administration. We see that it has a positive effect on the behavior of the students who use the halls in terms of fulfilling their responsibilities and improving their behavior (P1).*
>
> *We have stated that the students who use the gym have internal discipline. There are many positive aspects, and the negative aspects can sometimes cause accidents. A little more precautions need to be taken in this regard, it is a little difficult to control. I think that having a responsible person at the head of the students who play sports will eliminate these problems (P4).*

The positive views of some of the student participants are given below.

> *Students use the gym when their classes are free, so I find it positive. And they use it very regularly. But I find it even more productive for some students to use the gym by doing sports instead of having fun (S5).*
>
> *Positively, most of the students are responsible and they don't have any negative behavior, no harm to other students or the gym. In other words, I did not see any negative activity or attitude in this way (S7).*

The negative view of one of the student participants is given below.

> *Students who use the gym are damaging the walls of the gym, it's not good for them to damage it. I think they should be more careful when they do activities in the gym (S6).*

The views of some of the teacher participants are given below.

> *In schools with gyms, due to the financial conditions of the children, they have to come with all kinds of shoes during the course, so the wear and tear of the hall is a little too much, we can look at it negatively. Children may come to the gyms in places where the social and cultural structure is good with spare shoes, but since this is not suitable for the physical conditions and social environment conditions of the students in our school, they may have a negative opinion about this issue. On the other hand, we have always received the support of your school administration about the hall, we thank them. (T4).*
>
> *My observations are that while there is a positive development in general, I think that only students should be made aware of the use of tools and inventories and how to use them in relation to the environment, for example, in terms of not polluting the environment (T5).*

When participants' positive or negative views on the attitudes and behaviors of the students who use the gym were examined, all of the principals expressed positive views about the attitudes and behaviors of the students who used the gym and most of the students' views were positive except three. While half

of the teachers stated that the use of the gym reflected positively on the attitudes and behaviors of the students, and half of them said that it reflected negatively on them.

5. The effect of gyms on school success

The statements by students, teachers and principals on the effect of gyms on school success were examined according school principals, students and teachers and all of the statements of principals(f=4), students (f=9) and teachers(f=6) were positive.

The views of some of the principal participants are given below.

> *Having gyms contributes to the positive outlook of the student. The development of sports education in the halls also contributes positively to the success of the students in their academic courses. Because with the education students receive here, they become aware of taking responsibility and fulfilling their duties. We also see that they perform more behaviors that will contribute to their academic development in the future (P1).*

> *It has a very positive impact on the school's success, especially its academic success. Here we see that we are a science high school, children who do sports are really different from others and they come to much better points. You see that the child plays football very well, plays basketball or table tennis very well; at the same time, the child achieves tremendous academic success. I had a student who was playing football very well, for example, he ranked 610th in Turkey in YKS in the university exam, we have students who are in the top thousand who are successful in table tennis and are academically successful. Sport definitely has a positive impact on academic achievement (P4).*

The views of some of the student participants are given below.

> *If we think about sports success in gyms first, we can perform and achieve sports success against other schools in school sports because we can work thanks to the gym. Apart from that, in terms of academic success in school success, when we do sports, we can focus on the course because it develops our brain as a social activity and we can spend our time fun because we are not bored, we do not get distracted. That's why we are able to achieve academic success in a more focused way (S7).*

> *I think it has a positive impact on our school success. Because, according to a scientific study, we can focus better because people who do sports have higher happiness hormones. Therefore, since such a field is also given, it affects our courses well, because we need to relieve stress (S8).*

> *Since students who use the gym are physically healthier and mentally more vigorous, it positively affects school success (S9).*

The views of some of the teacher participants are given below.

> *I mean, when you say school success in schools with gyms, you know, in the academic sense or in the other sense? As I said at the beginning, since children are now in the age of technology, children are at least discharging some of their energy because they are sitting still at home, and I think this energy discharge makes it easier for children to study while sitting. In other words, it has an impact on your academic success, because in individual sports, especially in team sports, what it means to be a team, what it means to enjoy individual success, this is reflected in your other courses (T3).*

> *I really think that gyms have a 100% positive effect on the student's motivation in all subjects and their determination and willingness to study all subjects and their success in all subjects (T5).*

When we consider the development of children as a process, it is not only academically; we also care about their social and cultural sports achievements. In my own opinion, I think that children in schools with gyms are more interactive with other subjects and contribute more to their development (T6).

When students, teachers and principals' views on the effect of gyms on school success were examined, all of the school principal, students and teachers stated that the effect of the gyms on school success was positive.

6. Suggestions for more efficient use of gyms

The suggestions for more efficient use of gyms by the participants were examined according to principals, students and teachers. For principals increasing the usage time of the gym (f=2), increasing the physical capacity of the gym (f=1), having sufficient personnel in the gym (f=1) were sub-themes , for students: increasing the usage time of the gym (f=4), increasing the number of sports competitions (f=2), increasing the adequacy of gym equipment (f=2), increasing the cleanliness of the gym (f=1) and for teachers increasing the usage time of the gym (f=3), increasing the physical capacity of the gym (f=1), having sufficient personnel in the gym (f=1) and increasing the gym equipment (f=1).

The views of some of the principal participants are given below.

In order to use sports hall more efficiently, the priority is to contribute more to the maintenance and repair of the problems. Keeping the halls open more by creating personnel in charge of the halls. In addition, it is thought that planning the use of the hall and especially ensuring that other schools and clubs that will use the hall use the hall continuously with a healthy planning can be realized (P1).

The views of some of the student participants are given below.

We need more time, a course doesn't help anyone (S4).

In general, we can do the following in order to use them more efficiently: Indoor games, whether it is basketball, volleyball, football, they are mostly played in outdoor areas and whether it is table tennis or volleyball training, etc., in the gym will cause us to use it more efficiently. In addition, since the physical education courses do not overlap, since the 2 classes are together, there will automatically be more people in an area and we will not be able to use this area effectively. Therefore, it will be much better if our courses do not overlap, so that we can use them more efficiently (S8).

I think that the clocks of the teams that use the gym should be adjusted more appropriately. I think that the use planning of the hall should be done well (S9).

The views of some of the teacher participants are given below.

In order for gyms to be used more efficiently, different events need to be given more space. I would also like to express my opinion that the student should be given the time and opportunity to showcase his or her talents in the gyms while the student is in school (T4).

I think this is the most important issue here, in cooperation with the municipality and using the gym cleanly at all times. I think that our school and other clubs that will use the gym will be more efficient in the operation of the hall if it is done within a program and organizes it, at what time, for what purpose, within a certain plan and program (T5).

Outside of the classroom, we can say that it can be used openly to everyone with more planned, feasible planning (T6).

When themes for suggestions for more efficient use of gyms examined in general, the views of the school principal, students and teachers on increasing the time to use the gym in order to use the gym more efficiently were mentioned more.

Discussion

In this research it was understood and interpreted the views of principals, teachers and students on the effects of gyms in schools affiliated to the Ministry of National Education on students, teachers, principals and general functioning of the school. In this context, in the 2021-2022 academic year, the views of 4 school principals, 6 teachers and 9 students were obtained from the principals and teachers working in the schools with gyms in Manavgat and the students studying in these schools. This research is the first qualitative research in Turkey that aimed to determine the views of principals, teachers and students about the effects of gyms in schools affiliated to the Ministry of National Education on students, teachers, principals and general functioning of the school in Turkey. Therefore, the research findings are very limited in terms of comparison with other researches. Therefore, the findings of this research were discussed by comparing them with the findings of similar two researches on this topic in Turkey.

In this research, it was found that all schools affiliated to the Ministry of National Education must have a gym. It was also found out that in schools with gyms, students were better motivated to attend physical education classes. It was also revealed that physical education courses were taught better and more efficiently in schools with gyms. It can be said that the gym had a positive effect on the success of students in other subjects. Thus, it was concluded that the perceptions of school principals, students and teachers in the school gym were positive.

Similarly, according to the study conducted by Durdabak (2019), the attitudes of secondary school students in the central district of Edirne province towards physical education courses were compared according to whether there was a gym in their schools or not. As a result of the research, it was found that students in schools with gyms had a more positive attitude than students in schools without gyms. Additionally, this study found that students in schools with gyms were better motivated to attend physical education classes. It was found that physical education courses were taught better and more efficiently in schools with gyms.

In another study titled "Evaluation of the creation of a constructivist learning environment in physical education courses by teachers and students" by Elvan (2019), the views of teachers and students regarding the creation of a constructivist learning environment in physical education courses were evaluated and it was found that students who had a gym in their school had some important advantages. According to the results, it was also found that the students who had a gym had the ability to express themselves better, were able to empathize, supported positive thoughts and were able to process their courses in interaction and cooperation. These positive effects of the gym became even more evident in the courses where the constructivist learning approach was applied.

Conclusion

The first sub-problem of the research was "What are students, teachers and principals' views on gyms? ". According to the findings of the research, it can be said that the views of the school principal, students and teachers in the gym were positive. It was seen that only a teacher and a student had a negative perception of the gym.

The second sub-problem of the research was "What are students, teachers and principals' views on the effect of teaching the physical education course in the gyms on the efficiency of the course?" According to the findings of the study, all of the school principal, students and teachers participants said that the effect of physical education courses in the gym on course efficiency was positive.

The third sub-problem of the research was "What are students, teachers and principals' views on the effect of the use of gyms in terms students' behaviors on the courses other than physical education class?" According to the findings of the study, the school principal and the teacher said that all of the participants said that the students' use of the gym in other courses had a positive impact on student behavior. However, half of the students said that the students' use of the gym in other classes had a positive impact on student behavior, and half of them said that it reflected negatively on student behavior.

The fourth sub-problem of the research was "What are the principals' positive or negative views on the attitudes and behaviors of the students who use the gym?" According to the findings of the study, all of the school principal participants and the majority of the student participants expressed positive views about the attitudes and behaviors of the students using the gym. However, half of the teachers said that the use of the gym reflected positively on the attitudes and behaviors of the students, but half of them said that it reflected negatively on them.

The fifth sub-problem of the research was "What are students, teachers and principals' views on the effect of gyms on school success?" According to the findings of the study, all of the school principals, students and teachers said that the effect of the gym on school success was positive.

The sixth sub-problem of the research was "What are students, teachers and principals' suggestions for more efficient use of gyms?" According to the findings of the research, the views of the school principal, students and teachers to increase the time of using the gym came to the fore in order to use the gym more efficiently.

Recommendations

In line with the findings, following suggestions were put forward:

All schools affiliated to the Ministry of National Education should have a gym.

In schools with a gym, the physical capacity of the gym should be increased, the equipment deficiencies of the gym should be eliminated in a timely manner, and the time of use of the gym should be well planned and increased.

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Ethical approval

In the writing process of the study titled "**Students, teachers and principals' views on the effects of school gyms on functioning of the school**", the rules of scientific, ethical and citation were followed; it was undertaken by the authors of this study that no falsification was made on the collected data. "Journal Action Qualitative & Mixed Methods Research [JAQMER] and Editor" had no responsibility for all ethical violations to be encountered, and all responsibility belongs to the authors and that the study was not submitted for evaluation to any other academic publishing environment.

Ethics committee approval

Ethics Committee Approval of this research was obtained from Akdeniz University Social Sciences Ethics Committee at the meeting of 15 decision numbered 312 on September 8th, 2022.