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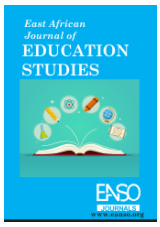

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Original Article

What Values are We Teaching? Reassessing the Affective Domain in Ugandan Primary Science Classrooms

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ABSTRACT

There is a growing global concern about the deliberate teaching of values in schools, rather than relying solely on learners implicitly "catching" these values. Likewise, policy frameworks in Uganda emphasise fostering values in learners. However, recent reports indicate numerous challenges related to morality among learners in primary schools, suggesting that fostering values is minimal or absent in these schools. This study explored the values that primary science teachers in Uganda deliberately foster in learners, focusing on their planning and classroom practices. Grounded in an interpretivist paradigm, the research employed a qualitative case study involving two government-aided primary schools purposively selected for their strong academic performance and consistent instructional planning. Data were collected through lesson observations, document analysis, and semi-structured interviews with five Primary Five and Six science teachers. Findings revealed that while teachers fostered a range of values, most commonly respect, responsibility, and care, these were often not deliberately planned but emerged incidentally during classroom interactions. Although participants demonstrated a clear conceptual understanding of values and articulated their importance, their lesson plans and schemes of work frequently lacked systematic integration of the values they deemed essential. Inconsistencies between planned and enacted values were also observed, with many values listed in official documents failing to appear in practice. Teachers reported relying primarily on the national science syllabus when selecting values for instruction, yet these were not always implemented during lessons. The study concludes that despite their awareness of values, teachers did not deliberately integrate them during science lessons. Consequently, there was a misalignment between instructional planning and pedagogical practice. The study recommends that policy frameworks, teacher education programmes, and school-level support systems be strengthened to promote systematic, intentional fostering of values in science classrooms.

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INTRODUCTION

In science education, the affective domain remains underexplored relative to the cognitive domain. Much of the literature focuses predominantly on cognitive outcomes, often neglecting moral and emotional dimensions (Corrigan et al., 2020). Since the 19th Century, scientists, students, and the general public are said to largely view science as "value-free", being a means to disclose objective facts about the world (Koster & de Regt, 2020). However, there has been increasing consensus challenging this claim due to the ethical implications of scientific practice.

Further, research suggests that integrating affective elements into any school subject could enhance the quality of learning (Seah, 2002). This is because affective qualities, including values, are fundamental drivers of human actions, reactions, and interactions (Saldaña, 2021). Therefore, recognising the importance of affective elements like values in science teaching can not only foster a more holistic learning but also promote more meaningful learning experiences as learners interact in classrooms.

In recent decades, both Western and non-Western countries have increasingly prioritised the identification of values most relevant for inclusion in school curricula. The central debate has shifted from whether values should be taught to which values should be emphasised, and in what contexts (Oddie, 2010). This question has generated considerable discourse across diverse cultural settings concerning "what and whose" values should be promoted in educational systems (Espinosa & González, 2024; Gökçe, 2021; Pulgarín, 2022). In many contexts, the ambiguity and contestation surrounding values have led to their marginalisation in favour of academic performance metrics.

Before 2005, public schools in Australia were generally reluctant to plan and deliver explicit fostering of values. A shift occurred when the federal government introduced a national values education policy (Jones, 2009). Similarly, several European countries began systematically developing curricula and materials to support values education (Halman, 2001). In India, policy documents from the 1960s onwards underscored education's role in moral development, and by 2012-2013, values-based components were integrated into summative assessments in selected classes (CBSE, 2012). These developments indicate a growing international commitment to (re)establishing values education within formal schooling frameworks (Harrison et al., 2021).

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The imperative to foster values in contemporary education has become increasingly urgent. In a recent Austrian study, 94% of teachers agreed that fostering values is more important than high examination scores (Kropfreiter et al., 2024). Thornberg and Oğuz (2016) also argue that the communication of moral values constitutes a core responsibility of teachers. Likewise, Harrison et al. (2021) report that both teachers and parents frequently prioritise character development over academic attainment. Furthermore, research has linked the neglect of fostering values to social issues such as bullying, discrimination, and aggression (Gunawardena & Brown, 2021). Conversely, emotionally and socially healthy learners are more likely to perform well academically (Clarke, 2020), partly due to increased engagement and reduced psychological barriers to learning (Jeynes, 2019; Zajda, 2023).

In Uganda, traditional precolonial societies were grounded in strong communal values that governed behaviour and moral reasoning (Republic of Uganda, 2013). Some scholars suggest that differences in school performance may be linked to values emphasised by teachers, particularly those related to hard work and discipline (Owens, 2005). However, as in other contexts (Cilliers et al., 2021; Odama, 2023), Uganda's emphasis on examination results often overshadows holistic educational goals (Sekiwu & Botha, 2014). This study, therefore, seeks to evaluate the values that teachers actively promote in Ugandan classrooms, contributing to a more comprehensive, values-integrated approach to science education.

LITERATURE REVIEW

While national core values and general curriculum values are often emphasised in education policy, individual subjects, including science, are also associated with discipline-specific values. Scholars have increasingly argued that science is not value-neutral but is in fact "value-laden" or even "value-full" (Simon & Connolly, 2020, p. 127; Nordqvist & Jidesjö, 2023). Despite the longstanding "value-laden vs. value-free" debate, numerous researchers (e.g., Allchin, 1999; Cooper & Loughran, 2020; Mansfield & Reiss, 2020; Smith & Corrigan, 2020) reject the notion that science is purely objective and free of ethical dimensions. Instead, science and science education are increasingly recognised as value-driven, capable of transmitting not only epistemic values but also broader moral and social values (Eyitayo, 2021).

Despite this recognition, some science teachers remain reluctant to engage with value-laden content, preferring a narrow, "value-neutral" approach (Ratcliffe, 2012; Kumarassamy & Koh, 2019). This tension is evident in multiple contexts, including England, Singapore, and New Delhi, where teacher beliefs diverge on whether science should address ethical or socially relevant issues. These differing views raise the need to explore teachers' practices in other settings, such as Uganda, particularly regarding the values integrated or omitted in science classrooms.

Science-based values are those closely linked to the nature and practice of science itself, distinct from more general values like teamwork or cooperation (Corrigan et al., 2020). While initial attempts to categorise these values were made by Kuhn (1981), the list remains evolving and incomplete. Allchin (1999) identifies values such as honesty (e.g., accurate reporting of results), novelty, accuracy, and precision as central to scientific work. Others, including open-mindedness, interdependence, and creativity, are considered core but are not exclusive to science (Corrigan, 2015). Marangio and Gunstone (2020) further highlight fairness, honesty, and creativity as embedded in practices like hypothesis testing, data analysis, and replication.

Such values, often referred to as epistemic values, support the goals of scientific inquiry and knowledge production. Yet their significance, especially in shaping learner behaviour, is debated when compared to moral values (Friberg-Fernros & Andersson, 2024). Moreover, epistemic values are relevant across disciplines, indicating that moral

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and social values should also be integrated into science education (Koster & de Regt, 2020).

Allchin (1999) cautions that while "ultimate values of science" should be emphasised, non-epistemic values, including moral, cultural, and political, should not be excluded from science teaching. Science teachers are thus expected to promote both the cognitive and affective aspects of learning, though many avoid this role due to a lack of confidence or training (Mansfield & Reiss, 2020). Consequently, values such as honesty are often implicitly embedded rather than explicitly taught. Given the perceived supremacy of cognitive content and the ongoing debate about "what and whose" values to foster in learners, the current study investigates which values primary science teachers in Uganda foster in practice.

Summarily, this literature review highlights the role of values in science education, challenging the common misconception that science is value-free. While scholars advocate for integrating science-based (epistemic) values such as honesty and accuracy into science teaching, research shows that many teachers either overlook or struggle to explicitly foster these values. Additionally, challenges remain in promoting epistemic values and broader social or moral values in classroom practice. The review, therefore, identifies a gap in what values to integrate into science lessons, particularly in contexts such as Uganda, where values education remains underexplored.

MATERIALS AND METHODS

This study adopted an interpretivist paradigm to qualitatively examine the values science teachers deliberately foster in learners. A qualitative naturalistic inquiry enabled the researchers to explore participants' behaviours and perspectives within their classroom contexts. This approach was selected for its strength in capturing the detailed interactions of participants (Grønmo, 2020).

A case study design was employed to investigate values integration practices in two purposively selected government-aided primary schools in Luweero District. This "two-case" design was not for comparison, but to provide complementary insights, enhancing the study's analytic richness (Yin, 2018). The selected schools, referred to as Mukisa P/S and Muliisa P/S (pseudonyms), were identified with support from experienced field-based teacher educators (Centre Coordinating Tutors, CCTs) based on their consistent work planning and relatively strong academic performance, both indicators of values such as hard work and diligence (Bulach & Butler, 2002).

The study targeted Primary Five and Six science teachers and their pupils, as science is formally taught at these levels. Six teachers were initially purposively selected; four from Mukisa P/S and two from Muliisa P/S. Due to staff turnover and scope alignment, five teachers ultimately participated in the full study. However, purposive sampling risks introducing selection bias. The chosen schools and participants may reflect only the perspectives of these CCTs, excluding those with different or contrasting practices.

Data were collected through unstructured observations, document analysis, and semi-structured interviews. Informed consent was acquired from participants. Sixteen science lessons were observed using a non-participant approach, guided by an open observation tool focusing on values integration. These observations were conducted before interviews to reduce observer influence.

To triangulate findings, enhancing credibility (Nowell et al., 2017), lesson plans and schemes of work from Term One were analysed to identify the values teachers intended to foster and compare them with observed practices, with lesson plans given priority due to their detailed nature. Five in-depth interviews were also conducted, two with Primary Five and three with Primary Six science teachers. The semi-structured format allowed for both consistency and flexibility (Cohen et al., 2018)

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while encouraging participants to support their views with concrete classroom experiences.

Data were analysed using an affective coding method, Values Coding, suitable for identifying participants' values, which is a qualitative coding method that applies codes to data reflecting participants' values (Saldaña, 2021). The Researchers read interview and lesson observation transcripts multiple times, to assign codes to key segments or value indicators, reflecting specific values in statements or communicative learning activities in which the participants were engaged. An example of values coding that guided data analysis is shown in Table 1.

Table 1: Selected Values and Their Values Indicators / Behaviours

Values Indicators / Key Segments	Value Code
I really try to build a sense of community in my classroom, where we treat each other with respect, and I will do my best to make you feel safe and secure.	Classroom community
There's no name-calling, no teasing or put-downs, no bullying.	Respect
I don't know if it's a work ethic or what, but I want them to be accountable, to be on task, to show some commitment, to follow through.	Responsibility

Note. Adapted from Saldaña (2021)

Table 1 shows some of the values identified during an interview with a teacher about ways of working with children. According to Saldaña, values may not always be directly stated by participants. What they mention during social interaction alerts the researchers about what may be valued, along with some noticeable clue phrases. This qualitative analysis provides richer opportunities for assessing the meanings of what the participant values. Bulach and Butler (2002) provide a more detailed template for the identification of value codes during classroom interactions. Since the main aim of the study was to identify values fostered, second-cycle coding (Gibbs, 2018) to develop broader themes or categories of values emerging from the data was not conducted.

RESULTS

A total of 16 lessons taught by six teachers were observed. However, to avoid identical findings within and across cases, which is likely for such a multiple case study, we only present findings for the very first time they came up during data collection. As such, data is presented for four of the six teachers. Generally, the lesson observations revealed a number of values that happened to be fostered implicitly.

Values Fostered in Learners by Teacher S51

Table 2 is a summary of the values that unfolded during the lesson conducted by Teacher S51 about *"parts of an egg"*, here indicated as Lesson 1.

Table 2: Values Fostered in Learners by Teacher S51 during Lesson 1

Values Indicators / Key Segments	Implied value
The teacher asked learners to clap for their colleagues who brought equipment for a class demonstration.	Appreciation
The teacher moved towards a pupil who was writing in a book as the teacher explained a concept; the pupil then closed the book without the teacher saying anything.	Responsibility, self-control, and hard work
Pupils raised their hands throughout the lesson to answer questions, being encouraged by the teacher.	Fairness, participation, and confidence
The teacher told the pupils: "Please be careful with the stove".	Care, safety awareness, and respect for property
While boiling an egg, the teacher continued with the general class discussion and illustrations.	Hard work, multi-tasking, and time management

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Values Indicators / Key Segments	Implied value
Some pupils did not have their notebooks. The teacher said: "Last time I told you, don't go before you pick your…" "…books." [Pupils responded in unison.]	Responsibility and preparedness
The teacher told the pupils, "In science, we do not use a ruler when drawing. You should not draw very tiny diagrams."	Responsibility and accuracy
The teacher prompted the learners that "I need someone to rub the chalkboard".	Volunteering and cooperation

The classroom observations presented in Table 2 suggest that the teacher fostered a range of positive values in learners. Analysis of the values indicators reveals an engagement technique to instil values that promote social responsibility and academic excellence. For instance, the teacher's non-verbal approach to correcting inattentiveness by moving towards a pupil rather than directly cautioning them demonstrates an implicit method of fostering attentiveness and respect without instilling fear. Furthermore, the encouragement of hand-raising before responding promotes participation and confidence. The teacher's emphasis on safety precautions, such as warning pupils about handling a burning stove, highlights the importance of responsibility and safety awareness, ensuring that learners internalise careful behaviour in practical situations. Generally, several values emerged during the lesson, with the teacher ensuring that learners not only acquire knowledge but also develop values that contribute to their moral development.

The second lesson taught by Teacher S51 was about 'the digestive system of a domestic bird', and the results are shown in Table 3.

Table 3: **Values Fostered in Learners by Teacher S51 during Lesson 2**

Values Indicators / Key Segments	Implied value
The teacher asked taller pupils to stand behind shorter ones to avoid obstruction.	Fairness
The teacher was assisted by the co-teacher and other pupils to slaughter and dissect a domestic bird.	Teamwork/cooperation
The teacher prompted the learners that "I need someone to rub the chalkboard".	Patriotism/citizenship /volunteerism
The teacher asked pupils belonging to other classes who were passing by not to interrupt or join the class that he was teaching.	Fairness and respect
A pupil checked for answers from the Pupils' Textbook as the teacher taught.	Honesty

The findings in Table 3 indicate that Teacher S51 fostered values in learners through classroom interactions. One of the key observations is the teacher's emphasis on fairness. Positioning taller pupils behind shorter ones ensures that all learners have equal access to the lesson, fostering fairness. This technique ensures that physical differences do not become barriers to participation. Additionally, the teacher integrated teamwork by involving both the co-teacher and pupils in the slaughter and dissection of a domestic bird. This participatory approach not only enhances practical learning but also encourages cooperation.

Values Fostered in Learners by Teacher S52

The next set of findings is for Teacher S52, who taught in the second Primary Five stream in Mukisa P/S. Table 4 shows the values that Teacher S52 fostered in learners during the lesson about 'the battery/cage system'.

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Table 4: Values Fostered in Learners by Teacher S52 during Lesson 1

Values Indicators / Key Segments	Implied value
Standing by the doorway ready for the next class, Teacher S52 signalled a colleague who was concluding a lesson that time was up.	Punctuality, hard work, patience, and responsibility
During lesson development, the teacher ordered pupils to stop writing.	Attentiveness and hard work
The teacher did not choose pupils who attracted attention, saying "me teacher" instead of raising hands.	Respect for self or others
The teacher encouraged learners to try answering questions.	Perseverance
The teacher asked pupils to stop writing as he explained.	Active listening, discipline, and hard work
A pupil gave the wrong answer, and the teacher asked who could make a correction to the answer.	Peer-learning and courtesy
The teacher asked pupils to stop playing in class.	Respect and hard work

Similar to Teacher S51, the findings in Table 4 suggest that Teacher S52 fostered various values in learners through classroom management techniques, giving instructions, and non-verbal signals. Among the key values evident is punctuality, as seen in his signalling to a colleague when their lesson time was over. This action promotes respect for time management and smooth lesson transitions. Additionally, directing pupils to stop writing during explanations reinforces attentiveness and active listening, ensuring that learners focus on understanding before note-taking. Teacher S52 also fostered recognition by addressing pupils by name. Such recognition can enhance learner engagement and build a sense of belonging.

Lesson 2, taught by Teacher S52, was about the digestive system of a domestic bird and findings are presented in Table 5.

Table 5: Values Fostered in Learners by Teacher S52 during Lesson 2

Values indicator	Implied value
Before entering class for the lesson, the teacher said: "Let us wait for my colleague to summarise her work."	Respect, consideration, patience, and collaboration
During the review of the previous lesson, pupils told the teacher the concepts that they covered in previous lessons.	Diligence, responsibility and honesty/integrity
Teachers labelled the parts of the digestive system of a domestic bird together with the pupils.	Cooperation and active participation
Pupils cooperated during the sharing or collection of learning materials.	Teamwork, fairness, and responsibility

The findings in Table 5 highlight values that Teacher S52 fostered in learners through classroom interactions and instructional activities. Observations revealed that the teacher encouraged respect and patience by waiting for a colleague to complete her task before beginning the lesson. This behaviour demonstrated consideration for others and professional courtesy. During the review of the previous lesson, pupils actively engaged in recalling concepts and spelling words from their books. This indicates a learning environment that promotes honesty, diligence, and responsibility, as pupils took ownership of their learning process.

By encouraging them to recall and articulate past lessons, the teacher cultivated a habit of academic integrity and independent effort. Collaboratively labelling the diagram and collection of learning materials also showcased the teacher's effort in fostering cooperation. By involving pupils in the process, the teacher encouraged responsibility and

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teamwork and active participation, making learning a shared experience rather than a passive activity. The findings therefore suggest that Teacher S52's instructional practices naturally embedded important values or moral lessons into daily classroom activities, reinforcing positive behaviour among pupils.

Values Fostered in Learners by Teacher S61

Lesson 1, taught by Teacher S61, was about reptiles under the topic "Classification of animals". The findings from observations highlight the values that Teacher S61 fostered in learners through classroom interactions and instructional practices. The teacher encouraged participation by motivating pupils to raise their hands before answering questions. This practice reinforced confidence, respect, and turn-taking, creating an environment where pupils felt recognised and valued. Pupils volunteered to demonstrate how amphibians move, displaying initiative and enthusiasm. This indicates a learning environment where pupils felt comfortable taking an active role in the lesson.

Similarly, the teacher reinforced discipline and fairness by reminding pupils to raise their hands before speaking, ensuring orderliness and equal opportunities for participation. Additionally, when pupils were asked to return teaching-learning aids through their friends, they complied without hesitation. This demonstrated cooperation, teamwork, and responsibility, as pupils worked together to maintain classroom organisation. Generally, the findings suggest that Teacher S61 created a supportive classroom that encouraged consistent reinforcement of values, playing a significant role in shaping learners' behaviours beyond academic content.

In another lesson about amphibians, also under the topic "classification of animals", Teacher S61, just like Teacher S51 and S52, encouraged honesty and academic integrity, but this time by having pupils write their answers on the chalkboard without copying from their peers. This approach promoted independence and personal responsibility in learning. When the teacher questioned whether some pupils were using textbooks while answering, those with open books immediately closed them. This suggests that pupils recognised the expectation of responsibility and self-discipline, reinforcing the value of academic honesty and accountability in their work.

By frequently reminding pupils to "try to use their heads," the teacher emphasised the importance of creativity. This encouraged learners to rely on their critical thinking skills rather than external sources, fostering intellectual independence. In addition, the teacher promoted peer support by asking pupils to clap for their classmates who successfully spelt words like "tadpole." This practice cultivated a positive and motivating learning environment where pupils appreciated each other's achievements and built confidence in their abilities. The collaborative development of lesson notes with pupils further reinforced teamwork and active participation rather than being passive recipients of knowledge. In general, these findings suggest that Teacher S61 created a supportive classroom environment where several values were implicitly promoted, shaping pupils' academic and social development.

Values Fostered in Learners by Teacher S62

Teacher S62 similarly fostered values through interactions with pupils. For instance, the teacher engaged learners in presentations, demonstrating a focus on developing confidence, initiative, and responsibility. Allowing pupils to take ownership of tasks, such as fixing a bow harp, promoted values such as responsibility and trust among learners. The teacher's management of classroom behaviour reflected an emphasis on discipline and attentiveness. Furthermore, urging pupils to write faster due to time constraints instils time management skills, preparing them to work efficiently within deadlines. The use of verbal compliments such as "nice" signifies an effort to

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create an encouraging learning environment, which motivates learners to actively participate. Generally, observations suggest that Teacher S62 employs an interactive teaching style that fosters values among pupils, supporting both academic engagement and personal development.

During another lesson, which was about the structure of the human ear, Teacher S62 fostered values through interactions with both her colleague and pupils. The classroom environment reflected collaboration, active engagement, and appreciation. Teacher S62 demonstrated teamwork when she accepted help from Teacher S61 in drawing the human ear before the lesson. This action set an example for pupils, showing that working together promotes achieving learning goals. It also fostered a positive professional relationship between teachers. During the lesson, active participation was encouraged as pupils engaged in brainstorming. This method built their confidence, making the lesson more interactive.

Instructing learners that "I hope you can now name the parts of the ear using the words here" suggests an emphasis on independent thinking and application of knowledge. Instead of simply providing answers, she encouraged pupils to use available resources, reinforcing their ability to learn and apply concepts on their own. Finally, Teacher S62 expressed gratitude and respect by appreciating Teacher S61's assistance. This recognition modelled the importance of acknowledging others' contributions, fostering a culture of respect and cooperation among both teachers and pupils. Generally, the data suggests that Teacher S62 created a classroom environment that promoted collaboration, confidence, and appreciation, all of which are essential values.

Popular Values that Emerged During Lesson Observation

Considering lessons observed, Table 6 summarises the values that emerged to be fostered by the four teachers whose findings are presented. The table gives a broader interpretation of the values that teachers popularly fostered.

Table 6: Popular Values Fostered during Lessons Conducted by Different Teachers

Values Fostered	S51	S52	S61	S62
1. Appreciation	+	-	+	+
2. Confidence	+	-	+	+
3. Cooperation/teamwork/collaboration	+	+	+	+
4. Courtesy/politeness	-	+	+	-
5. Creativity	+	-	+	+
6. Encouragement	-	-	+	+
7. Fairness	+	+	+	+
8. Hard work	+	+	-	+
9. Honesty/integrity	+	+	+	+
10. Participation	+	-	+	+
11. Patriotism/citizenship/volunteerism	+	-	+	+
12. Respect	+	+	+	+
13. Responsibility	+	+	+	+
14. Self-discipline/self-control	+	+	+	+

According to Table 6, fourteen values were fostered by at least three of the five teachers. The data is represented using symbols, where "+" indicates a "value fostered", while "-" signifies "value not fostered". Generally, all five sampled teachers fostered multiple values, suggesting the use of diverse teaching techniques. Respect and responsibility appeared to be the most popularly

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fostered values, as they emerged in lessons taught by all five teachers. The emphasis on these two values may indicate their fundamental role in maintaining discipline and ethical conduct amongst pupils in the case study schools. Eight other values, including appreciation, cooperation and confidence, were also widely nurtured, indicating that a broad spectrum of values is integrated into science teaching, whether intentionally or incidentally as a by-product of teaching practices.

In terms of individual inclination, Table 6 also shows that fostering of values was prioritised by all teachers, although to different extents, with Teacher S61 and S62 having promoted the most of the fourteen popular values (thirteen). Generally, all the teachers promoted more than half of these 14 popular values during their lessons, implying a high regard for positive behaviour among learners. Occasional fostering of specific values suggests that these values may be incidental rather than part of regular teaching practices.

Analysis of Values in Teachers' Schemes of Work and Lesson Plans

To determine whether the fostered values were those that teachers planned in order to conclude whether they were deliberately fostered, the Researchers had to compare the values that emerged to be fostered during lesson observations with those that the teachers planned in their schemes of work or lesson plans. In Mukisa P/S, Teacher S51 did not present any scheme of work or lesson plan up to the time of ending school service, before the study concluded. It was therefore difficult to ascertain whether the values that this teacher appeared to foster were deliberately planned. The next subsections show results from documentary analysis of the schemes of work or lesson plans for Teacher S52, S61, and S62.

Values Planned to be Fostered by Teacher S52

Teacher S52 indicated four values in the scheme of work for the schemed topic "Keeping poultry and bees". These are care, love, responsibility, and concern. This teacher repeated the four values in all the subtopics or individual periods in the scheme of work. Of the four values that this teacher planned in the scheme of work, only responsibility emerged during the lessons observed. Although planned to be fostered, care, love, and concern did not emerge during the lessons that were observed. However, several values that this teacher had not planned emerged during the lessons observed in progress (Tables 4 and 5). The fact that a range of unplanned values emerged to be fostered during the lessons observed suggests a lack of deliberate planning to foster values during the lessons taught.

Values Planned to be Fostered by Teacher S61

The four lesson plans for Teacher S61 about "Classification of animals", including those for the two lessons that were observed, revealed no values in the values section of the lesson plans. This suggests that right from the planning stage of the lesson, the teacher did not prioritise values. Therefore, deliberately fostering them during a lesson in progress was doubtful at this stage of data collection. However, lesson observations indicated that various values emerged to be fostered during lessons conducted by this teacher (Table 6), although none appeared during the planning stage. Unplanned values emerging to be fostered during the lessons observed in progress suggest a lack of deliberate planning to foster these values.

Values Planned to be Fostered by Teacher S62

Only one value, 'responsibility', was indicated for the period about "Musical instruments" in the scheme of work of the lesson observed being taught by Teacher S62. Just like Teacher S61, S62 did not indicate any values for most of the subtopics in the scheme of work. However, just like for Teacher S52 and S61, lesson observations indicated that various values emerged to be fostered during lessons conducted by Teacher S61 (Table 6), suggesting a lack of deliberate or structured fostering of values

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in learners, potentially leading to inconsistencies in how values are integrated into teaching.

Assessment of Values that Teachers Fostered in Learners According to Interviews

Interview data was collected to reliably answer the questions "what values" and its counterpart "whose values", to supplement observation data and document analysis data from schemes of work. This data is presented in the next subsections. The total number of teachers who were interviewed is five, three from Mukisa P/S and two from Muliisa P/S.

Firstly, the Researchers intended to establish what the term "values" meant to the teachers in order to draw their focus to the key concept of the study. Most of the teachers confidently articulated the meaning of "values", apart from one who struggled to define them. All the definitions that they put forward incline to socially acceptable standards of behaviour. All participants, however, gave relevant examples of values, implying that they were familiar with this concept.

Observations in natural social settings rely more on researchers' inferences of values, and so the most direct way to find out what someone values is to simply ask him or her what they value or what is important to them (Saldaña, 2021; Döring et al., 2024). When asked about the values that they considered important to focus upon during their lessons, participants mentioned various values as shown in Table 7.

Table 7: Values Teachers Consider Important to Focus Upon

Value	Teacher Code
Care	S52 S61 S62
Responsibility	S61
Love	S52
Appreciation	S52

According to Table 7, care was the value considered by most of the teachers to be of cardinal importance. Teacher S61 justified the importance of care and responsibility as follows;

> *Care, because in science, there are a number of living things that we need to take care of and be responsible for their existence. When you care for them, in one way or the other, you also care for yourself.*

Similarly, Teacher S62 merited care by relating to its importance to the human body, saying that: "After learning about the functions of body parts, you learn how to care for them, because you know that they are important. So *automatically*, you will have that value of care in you". Indeed, all the teachers either schemed or lesson planned "care" during their preparation.

Apart from care, the other values that the Primary Five teachers mentioned were appreciation, love, responsibility and cooperation, love being mentioned by Teacher S52. This teacher further elaborated on the value 'love':

> *You have to love the learners. You don't [have to] give a serious punishment. In case a learner gives an incorrect answer, you just have to appreciate that one, and tell him/her that next time, better, so that the child does not fear giving the answer.*

Teacher S52 enlisted love in the scheme of work, although it is inconclusive whether this teacher deliberately intended to foster it. Teacher M61 considered sharing as an important value to focus upon during the current school term, especially during her engagement with group work in Primary Six: "They [pupils] share ideas, opinions, exchange views, and come to an understanding of a common answer. They have to agree on something. Through sharing, there is also leadership." However, sharing was not reflected anywhere in the schemes or lesson

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plans of this teacher, suggesting that it was not intended to be fostered.

The findings generally reveal that there was a lack of consistency in values that teachers fostered, right from the values planned in the schemes or lesson plans, to those that were observed to emerge in the lessons, and even those that the teachers reportedly cherished, as revealed during interviews.

The Researchers further inquired about the main source of values that teachers included in their interaction with learners to further establish if they had a structured approach to fostering them. Four of the five teachers interviewed mentioned the printed curriculum as the main source of values they fostered in learners. They also indicated that the Teacher's Guide includes some values, but they are not well laid out. Teacher S61 specifically identified the preface section of the Teacher's Guide to hint at values. Teacher S62, however, gave an insightful submission about the linkage between subject topics and values in the syllabus:

> *Values come from the topic and subtopics that a teacher is to handle. For example, the body has different organs; we get to know that it has different parts, including the heart, which is a delicate organ that performs a major function in our life, so we need to care for it. There are activities we have to do in order for the heart to perform well. The values to teach should align with the content that a teacher is to teach. The values listed in the curriculum should relate to the topic.*

However, apart from care, Teacher S62 could not provide other examples of values that relate to specific subject content. This teacher also revealed occasional usage of the curriculum by saying:

> *…but do we have a curriculum in this school? We rarely use the curriculum. As far as I know, we have to teach this and this. I do not use the Teacher's Guide either. Pupils' Textbooks are also there [in the library], but they are few.*

This means the main reason for not using various documents, such as the Teacher's Guide and the curriculum, was the scarcity of these documents. The participant also revealed not to have used any other documents with values education content.

When asked about other sources of values they fostered in learners, all but one teacher appeared to be in general agreement that religious values are inculcated in learners in their school, although specific ones could not be identified. Only one of the teachers interviewed specified at least one value fostered in learners: "I am not so sure, but for such a religiously founded school, there must be some values like love" (Teacher S61). "The school has some values, but they are not specific" (Teacher S62). "Of course they have some values... They fear God" (S52). Teachers further narrated provisions in the school timetable for attending worship services. It is therefore likely that religious values impacted learners' behaviour in these schools, although schools provided no clear guidance on which values to prioritise.

DISCUSSION

Findings from observations revealed that all participating teachers fostered multiple values during science lessons, with respect and responsibility being the most prominent. The emphasis on these values is consistent with literature that highlights their centrality to moral development and social cohesion (Ayten & Polater, 2021; Lickona, 2009). Their long-standing inclusion in educational discourse as "traditional values" (Beckley et al., 2018) reinforces their foundational role in values education.

Interviews, however, indicated that care, followed by responsibility and love, were most valued by teachers. These findings align with prior research emphasising care and love as key to nurturing constructive relationships (Ayten & Polater, 2021). Despite this, only one teacher explicitly planned for these values, suggesting a disconnect between teachers' beliefs and their instructional planning.

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Beyond the core values, teachers nurtured several others, such as cooperation, confidence, and appreciation, often incidentally, without reference to a structured values framework. This aligns with arguments that formal education typically promotes values aligned with rule compliance and personal responsibility (Bryan, 2012). The broad range of values observed supports the idea that values can emerge spontaneously from teaching practices, rather than from a predefined list (McDonnell, 2023).

Despite articulating a clear understanding of values, most teachers did not implement them systematically in lessons. Observed values often diverged from those planned in lesson documents, indicating a misalignment between planning and classroom practice, an issue also noted by Masote (2016). This gap was attributed to the absence of concrete strategies for integrating values meaningfully into instruction (Strangeways & Papatraianou, 2016).

While teachers cited the science syllabus as their main reference for identifying values, analysis of lessons revealed little alignment with this document. Instead, teachers appeared to draw on personal experiences and classroom dynamics. The findings further suggest that while teachers recognised the influence of religious values in their schools, there was a general lack of clarity regarding which specific values were being fostered. Most teachers could not identify particular religious values beyond unclear references, such as fearing God. This ambiguity points to an informal and incidental transmission of values, often assumed rather than deliberately integrated into teaching practices.

Although provisions like scheduled worship suggest that religious values may shape learners' behaviour to some extent, the absence of formalised guidance on which values to prioritise weakens their intentional impact. This reflects a broader concern raised by values education scholars regarding the need for explicit frameworks to guide schools on fostering specific values (Beckley et al., 2018). Without such structures, teachers are left to rely on personal assumptions or school traditions, resulting in inconsistencies in what and whose values to foster, even in schools with strong religious foundations. Consequently, the selection and implementation of values in science teaching were largely unstructured and incidental, highlighting the need for deliberate, well-informed planning of values education.

Despite providing insights about what values teachers foster, this study faced some limitations. The small sample size, involving only two schools and five interviewed teachers, limits the breadth of perspectives captured. Although qualitative research prioritises depth over breadth, this narrow scope reduces the generalisability of findings (Etikan et al., 2016). Additionally, potential observer bias could not be entirely ruled out, given that classroom observations and interpretations were conducted by the same researchers (Nowell et al., 2017). Even with triangulation to enhance credibility, researchers' positionality may have potentially influenced what was noticed or emphasised (Berger, 2015).

Nevertheless, the findings of this study have significant implications for education policy in Uganda, particularly regarding the integration of values in the primary curriculum. Although the science syllabus outlines certain values, teachers reported to receive little guidance on how to translate these into meaningful classroom practice. Without a structured guide, teachers are likely to continue fostering values inconsistently. This is a concern given a strong emphasis on academic achievement, where examination scores often overshadow character formation in Uganda (Sekiwu & Botha, 2014). Therefore, there is a need for curriculum developers and policymakers to provide clear frameworks linking subject content with specific values, supported by the Teacher's Guide and assessment guidelines. A more systematic embedding of values would strengthen the broader

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role of schools in nurturing moral development and developing social cohesion (Ayten & Polater, 2021).

Additionally, the study highlights the need for a stronger focus on emphasising values in teacher training and continuous professional development (CPD). While teachers demonstrated general awareness of values, their lesson plans showed limited deliberate planning for values integration. Lin et al. (2025) and Terzioğlu (2022) express similar concerns about how values are given limited attention, revealing gaps emerging from superficial engagement with the curricula during teacher training. This gap indicates that teacher education programmes should not only cover values conceptually but also offer practical strategies for incorporating them into classroom teaching. Providing teachers with reflective tools and pedagogical models would equip them to foster both academic and moral development, supporting national educational aspirations such as Uganda's Vision 2040.

Overall, the findings highlight both the potential and the challenges of fostering values in science classrooms. While teachers demonstrated an awareness of the importance of values, gaps between planning and practice suggest the need for clearer guidance and structured pedagogical strategies. Addressing these inconsistencies is essential for developing more coherent fostering of values in science education. The following conclusions and recommendations offer practical ways to strengthen values integration in primary science teaching.

CONCLUSIONS

This study concludes that while primary science teachers in the sampled Ugandan schools fostered several values, most notably respect, responsibility and care, these efforts were largely incidental and not systematically planned. Although teachers demonstrated a sound conceptual understanding of values, this was not consistently reflected in their teaching practices. A misalignment was evident between the values documented in schemes of work and lesson plans, and those actually emphasised during teaching.

Furthermore, while the science syllabus was cited as the main reference for values integration, classroom implementation did not reliably correspond to the planned content. Additionally, while religious influences were acknowledged, schools provided no clear guidelines for teachers on which values to prioritise. This inconsistency suggests that teachers' lived experiences and immediate classroom needs may have exerted greater influence. These findings highlight the absence of an established framework to guide values integration in science teaching.

RECOMMENDATIONS

In light of the findings, several recommendations emerge. Firstly, teacher education institutions and policymakers like the Ministry of Education and Sports (MoES) should develop practical modules on planning and implementing the fostering of values during subject teaching. Through CPDs, teachers should be supported to move beyond incidental fostering of values by being trained on how to deliberately integrate values into lesson planning.

The ambiguity between values planned and values taught could be reduced by the National Curriculum Development Centre (NCDC), teacher education institutions and the MoES developing a framework with practical strategies to guide values integration in the science syllabus and science teaching. Resource materials should illustrate how values can be embedded in primary science, drawing on classroom experiences.

One key strategy is encouraging teachers to link values to specific science topics and activities within the content they teach. For example, when teaching about environmental conservation, values such as responsibility and care can be intentionally embedded through classroom discussions, group activities, and project work. Lesson plans should include learning outcomes not only for content but

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also for the values to be fostered. Additionally, teachers can use reflective exercises and questioning techniques during lessons to prompt learners to reflect on how science concepts relate to real-life ethical or social issues, encouraging both cognitive and moral engagement.

Group activities can also be structured to promote values like cooperation, honesty, and respect by assigning roles and encouraging peer evaluation based on both task performance and demonstration of agreed values. Moreover, schools can adapt assessment rubrics to include criteria that recognise and reward learners' demonstration of values during science-related tasks, creating a better alignment between intended learning outcomes and actual classroom practice.

Since teachers reported that their schools provided no clear guidance on which values to prioritise, formalising school-level policies would address this ambiguity and provide schools with a coherent framework. Schools should formulate internal guidelines specifying which values they intend to collaboratively foster across subjects and by school administrators, to provide coherence in what values to foster.

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