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## Curriculum Concepts Appropriate in Addressing “How” and “Why” Knowledge in Agricultural Sciences Pedagogical Practice

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**Abstract.** South Africa’s Curriculum Assessment Policy Statement (CAPS) specifies the content to teach and confines pertinent curriculum concepts to addressing the questions of “what”, “how” and “why” in teaching practice. Cultural-historical activity theory (CHAT) was used as a lens, because it is driven by human activity (teachers) and the six principles teachers should embrace in the activity system (the classroom). The prescriptive, communal and habitual perspectives (PCHP) framework personalises CHAT principles by producing curriculum concepts that underpin Agricultural Sciences (AGRIS) practice, while addressing the questions of “how” and “why”. The study presents emancipating action research of six AGRIS teachers to explore curriculum concepts they use to address the questions of “how” and “why” when teaching AGRIS in secondary schools. Reflective activities and semi-structured interviews were used to generate data. Purposive sampling was used to select the most convenient six participants. The findings indicate that teachers’ teaching is dominated by content, which addresses the “what” question; teachers were unaware of other concepts that underpin AGRIS practice. This suggests that teachers mainly impart scientific knowledge when teaching AGRIS and neglect skills and values/attitudes. Consequently, this study recommends an intervention from AGRIS curriculum developers in South Africa to infuse curriculum concepts to address the questions of “how” and “why” in CAPS. The study will contribute to scholarship by bringing an in-depth understanding of curriculum concepts pertinent to the needs of learners and society. It will further assist AGRIS curriculum developers and teachers in producing globally competent learners with the right skills and values/attitudes.

**Keywords:** curriculum concepts; scientific knowledge; vertical knowledge; indigenous knowledge; diagonal knowledge

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## 1. Introduction

South Africa's Agricultural Sciences (AGRIS) CAPS curriculum is performance-based, yet teachers' emphasis is on acquisition of knowledge ("what") by learners, rather than skills ("how") and values ("why") (Adiaha et al., 2024; Baas & Tsotetsi, 2023). However, the AGRIS CAPS (2011) document states that teachers should base their pedagogical practices on three aspects, namely knowledge, skills and values/attitudes, to address the questions of "what", "how" and "why". Fomunyan (2014b, 2017) and Khoza (2016a, 2016b) posit that any curriculum is not balanced if it does not address the questions of "what", "how" and "why". However, curriculum developers focused only on the questions of "how" and "why" when developing South Africa's AGRIS CAPS curriculum (Le Grange, 2016; Waghid & Davids, 2016).

Bantwini (2015) thus found that AGRIS teachers are experiencing challenges due to a lack of pedagogical and social knowledge. In schools in South Africa, AGRIS teachers are struggling to understand and contextualise curriculum concepts (Mpungose, 2021). This problem is due to the fact that AGRIS teachers are unaware of curriculum concepts to address the questions of "how" and "why". Consequently, AGRIS teachers in South Africa rely solely on textbooks, just-in-time documents and past examination papers to teach AGRIS (Adiaha et al., 2024; Baas & Tsotetsi, 2023), which only address the question of "what". The literature cited above suggests a discrepancy between teachers' pedagogical practices and curriculum stipulations and/or expectations.

The rationale for this study is to enlighten curriculum developers that adequate knowledge is inadequate in the workplace and in community development discourse. This is confirmed by Blackburn et al. (2015) and Peden (2015) when they posit that the workplace demands learners with subject matter knowledge, learning experiences, and crucial skills relevant for the job market. A report by AgriSETA (June 2019) states that the youth employed by the agricultural sector lack skills and interest in agriculture. As a result, much money is spent on skills development within the sector. That is why this research advocates for curriculum concepts pertinent to addressing the questions of "what", "how" and "why".

This scholarship seeks to explore the curriculum concepts teachers use to address the questions of "how" and "why" when teaching AGRIS in secondary schools. The study is guided by the following question:

- What are the curriculum concepts teachers use to address the questions of "how" and "why" when teaching AGRIS in secondary schools?

## 2. Literature review

### 2.1 Curriculum concepts to address the question of "how"

The question of "how" is addressed by all teaching and learning activities that focus on how learning occurs and how AGRIS teachers facilitate the process of supporting learners to construct knowledge to achieve learning outcomes (Khoza, 2023). In other words, the facilitation process should promote skills acquisition, which learners can use to develop and improve their societies. This is consistent with the views of Czerniewicz and Brown (2014), Berkvens et al. (2014), Waghid

and Davids (2016) and Le Grange (2016), who argue that the question of “how” revolves around people’s opinions. It puts society at the centre of teaching and is in line with horizontal knowledge, which develops the psychomotor domain. Horizontal knowledge is practical and based on learners’ experiences and problems in their distinctive communities (Khoza, 2019). This knowledge cannot be acquired in schools, as it is contingent on social context and culture; it is practical and unsystematic (Hoadley & Jansen, 2012). This is why Mpungose and Khoza (2020) assert that the AGRIS teacher’s facilitation process should promote collaboration, group work and peer assessments to establish whether learners have achieved the learning outcomes. AGRIS teachers should therefore enact the following curriculum concepts to address the question of “how”.

### *2.1.1 Indigenous knowledge*

Indigenous knowledge (IK) is compatible with learners’ backgrounds, and it enables learners to retain knowledge taught from early childhood within their household and society (Ogbo & Ndubisi, 2018). Mawere (2015) and Jackson et al. (2016) explain that this knowledge is of the past, it is learnt by practice, it is stored orally and in cultural experiences, and it is ecologically sustainable. Mothwa (2011) argues that societal knowledge, or IK, is crucial in constructing new information and in increasing learners’ judgement of the relevance of science to their everyday lives. This suggests that IK enables AGRIS learners to understand the complexities of scientific knowledge. However, AGRIS teachers should discern the nature of such knowledge, as it differs from one culture to another. Consequently, the rubric should guide the marking of all learning activities that address the question of “how”.

### *2.1.2 Learning outcomes*

Learning outcomes involve measurable skills and capabilities that learners should have developed upon completing a particular topic (Clark et al., 2020; Goh et al., 2017; Paolini, 2015). Stupans et al. (2016), Hassan et al. (2016) and El Sheikh and Assaad (2018) confirm that learning outcomes are a statement of what a learner is supposed to know, understand and be capable of doing at the end of a learning phase. This suggests that AGRIS teachers should measure and observe learners’ psychomotor skills acquired through learning outcomes (Khoza & Biyela, 2020; Mpungose, 2020a). Thus, learning outcomes belong to learners rather than to teachers. That is why teachers should state the learning outcomes before the lesson. If teachers fail to state the learning outcomes to learners before content presentation, learners may fail to cooperate during the lesson.

### *2.1.3 Software resources*

Software (SW) resources carry data to be shown to communicate learning. These resources are intangible but can be seen (Khoza, 2017b, 2018; Sokhulu, 2023). SW resources provide platforms for learners to discuss, create and share their experiences (Khoza, 2017b; Mpungose, 2020a). In most of the studies conducted by Khoza, examples of SW resources are given as overhead projector transparencies, PowerPoint slides, CDs, DVDs, YouTube videos, Facebook, e-books, Google, Yahoo, emails, Microsoft Office and websites. Alabdulkareem (2015), Vural (2015) and Mpungose (2020b) add Twitter, Wikipedia, WhatsApp, Telegram and Instagram as examples of software tools. These resources can be

classified as synchronous teaching, where teaching is incorporated into *real time*, using the internet, audio- and videoconferencing, and PowerPoint presentations, or asynchronous teaching, where teaching is associated with the *time-delayed* abilities of the internet and utilising email, discussion forums, newsgroups and file attachments (Budden, 2016). This suggests that WhatsApp in AGRIS addresses socialisation experiences, where learners share their cultural knowledge, ideas and opinions based on content. In other words, SW resources bring new opportunities for improving teaching and learning experiences. Thus, AGRIS should not employ the WhatsApp platform to push the boundaries of the “what” question.

#### 2.1.4 *The role of the facilitator*

Mpungose (2016b) asserts that the facilitator directs learners’ knowledge, by giving them activities to construct the content they learn. The facilitator’s core function is to facilitate teaching, by creating a welcoming environment for learners to reflect on and create meaning from their daily life experiences (Kolb et al., 2014). A facilitator enables learners to control the lesson process, linking it to problems existing in society and the workplace (Ameyaw et al., 2017). Evans et al. (2019) and Martin et al. (2020) confirm that facilitator roles are mainly driven by creating a conducive teaching environment that promotes active participation, social conversations and effective teaching. This suggests that in AGRIS, the facilitator encourages learners to employ their decision-making and judgement, by using their knowledge, rather than the teacher’s knowledge or scientific knowledge.

#### 2.1.5 *Learner-centred method*

A learner-centred method is an approach that shifts the focus of teaching from the teacher to the learner to develop learners’ critical thinking (Du Plessis, 2020; Logenswaran et al., 2021). McKim et al. (2017) refer to this teaching method as one where learners use their interests and experiences to construct new knowledge. In AGRIS, constructivism drives this method, where learners make meaning and present real-life situations to solve and understand scientific knowledge.

Roman (2015) posits the following key principles teachers should consider when using learner-centred methods: (1) learners must have complete control of their learning; (2) knowledge must be appropriate for and meaningful to learners; (3) learner engagement and active participation is essential; (4) good relationships between learners are crucial; and (5) the teacher should act as a facilitator. This suggests that an AGRIS teacher should have adequate knowledge of learners and their context to enact this method effectively. There is a need for research to explore AGRIS teachers’ use of a learner-centred method in their respective classrooms.

#### 2.1.6 *Peer assessment*

It is essential for any curriculum to embrace social assessment to address social aspects (Maba & Mantra, 2017; Panadero & Brown, 2017). In this regard, peer assessment is optimal in addressing social needs (Kisaka-Jwan, 2019; Mabuza, 2018). Peer assessment involves learners assessing other learners’ work using prescribed criteria, which is a rubric (Double et al., 2020; Mpungose, 2018). Such

peer review is powerful and capable of addressing social matters. Furthermore, this type of assessment is useful in meeting learners' current needs without compromising their capability to meet their future needs (Harrison et al., 2015; Maba, 2017). In AGRIS, peer assessment is crucial in bringing in-depth judgement of scientific knowledge through the ideas and opinions learners have from their backgrounds. However, AGRIS teachers should understand that prescribed answers or marking guidelines are prohibited in peer assessment, but learners should receive rubrics to mark their peers' work.

## **2.2 Curriculum concepts to address the question of “why”**

To address the question of “why” in education, a combination of vertical and horizontal knowledge, called diagonal knowledge (DK), is required (Khoza, 2020; Ngubane-Mokiwa & Khoza, 2021; Sokhulu, 2021; Zuma, 2020). DK is knowledge that bridges the gap between vertical knowledge, which is based on facts, and horizontal knowledge, which is influenced by society through socialisation (Makumane et al., 2022). In other words, this type of knowledge is unique to individual teachers to develop learners' values/attitudes towards the subject (Ball et al., 2008; Makumane et al., 2022).

However, Khoza (2019) argues that DK can enable learners to balance principles of vertical and horizontal knowledge to produce outcomes that benefit unique individual needs. This suggests that in AGRIS, this knowledge can assist teachers in developing learners' interest in the subject, while enhancing their understanding of scientific knowledge. For instance, the teacher can utilise their unique knowledge to break down complex or abstract concepts into simple meanings. The success of addressing the question of “why” is contingent on the following curriculum concepts.

### *2.2.1 Teacher knowledge*

Teacher knowledge is the knowledge an individual teacher has from their experiences and profession (Verloop et al., 2008). Zembylus (2007) posits that teacher knowledge involves the teacher's experiences of the subject and learners and the broader social and political setting in which teaching and learning occur. According to Ahanonye et al. (2024), the teacher's knowledge can evoke learner values and principles related to social practices within the subject. This suggests that in AGRIS, teachers' experiences are pivotal in ensuring that learners understand content. However, teachers must know how to enact their experiences in the context of AGRIS pedagogical practice.

### *2.2.2 Aims*

Aims are teachers' long-term goals, which give them the impetus for teaching the subject and addressing an individual's identity (Khoza & Biyela, 2020; Mpungose, 2020a). Ndlovu (2017) and Hardison (2017) confirm that aims are statements of the teacher's intentions that provide direction on how teaching should occur, and they are formulated from the teacher's experiences to indicate implicit knowledge. Aims involve individual teachers' ideas, ambitions and techniques that can assist both the teacher and the learner to create a favourable atmosphere dominated by personal identities and meanings (Khoza, 2016a; Mpungose, 2016b). This suggests that AGRIS teachers can use their experiences to design learner activities that

promote effective teaching and learning. However, prescribed documents dominate South Africa's AGRIS CAPS curriculum, which negatively impacts teachers' ability to enact aims successfully.

### *2.2.3 Ideological-ware resources*

Ideological-ware (IW) resources refer to the theories underpinning AGRIS teaching that do not involve technology (Khoza, 2015a). Subject theories guide teachers in teaching appropriately, as they explain teaching factors and concepts (Khoza, 2019b; Khoza & Biyela, 2020; Mpungose, 2020a). These resources are invisible and intangible, and they consist of ideas, knowledge, skills, values, experiences, teaching/learning techniques, and teaching/learning theories (Khoza, 2017b, 2017c, 2018).

They play a fundamental role in teaching, allowing facilitators to impart ideas and pedagogical knowledge on the subject matter (Zuma & Mthembu, 2023). This suggests that AGRIS practice can be transformed and improved by involving IW resources. These resources should drive the implementation and enactment of any curriculum, and they should be structured to elicit individual identity kept in teachers' subconscious mind to address learners' needs (Khoza, 2016a).

### *2.2.4 The role of a researcher*

The role of a researcher is to generate new knowledge for the subject, while being concerned with structuring teaching pertinent to the human education of all social beings in secondary schools (Fagundes, 2016). A researcher is characterised by improved knowledge, skills, attitudes, beliefs and values acquired from teacher education, past experiences and qualifications (Tam, 2015). They have self-efficacy and display highly innovative ideas to work with struggling learners, thus strengthening their efforts and performance (Thoonen et al., 2011).

Khoza (2017b, 2019a) explains that a researcher focuses on various techniques to address the needs of individuals, using the unconscious, the subconscious or the conscious mind to perform their duties effectively. This suggests that a researcher can transform a set teaching practice by bringing in self-knowledge and ways in which self-knowledge is utilised in the teaching process. In AGRIS, a researcher can bring transformation by integrating new information and new interpretations into lesson presentations. Above all, researchers may provide constantly developing ideas and judgements that challenge the status quo.

### *2.2.5 The teacher-centred method*

The teacher-centred method focuses on the teacher as the primary source of knowledge (Lau, 2020). This method is influenced by experiences gained during the teaching process, resulting in individual teacher behaviour (Berkvens et al., 2014; Khoza, 2015b; Mpungose, 2018). According to Khoza and Biyela (2020) and Mpungose (2018), this method is driven by beliefs stored in and retrieved from the subconscious mind to generate the teacher's role, addressing the teacher's needs without being objective. This method requires a good-quality teacher who presents a model character to learners, based on thoughts saved in the subconscious mind, enabling the teacher to take personal action to address personal needs (Misdi et al., 2013). In AGRIS, this method drives teachers to

design personal activities that are vital in the teaching process in addressing learners' individual needs. However, professional development is essential for teachers to design teaching activities that enrich learners' needs.

### *2.2.6 Formative assessment*

Formative assessment is rooted in teacher knowledge and beliefs about the subject (Widiastuti et al., 2020). Due to the paradigm shift in assessment, formative assessment has become an important type of assessment, which emphasises feedback as the core element, while embracing the constructivist method (Bhagat & Spector, 2017; Ismail & Mohammad, 2017). Box et al. (2015) and Furtak et al. (2016) define formative assessment as a process, rather than a single occurrence, including the teacher's and the learners' experiences to improve learning.

However, Mokhtar and Adnan (2017) posit that formative assessment is assessment of learning, and that it disregards the assignment of marks to learners' performance but rather aims to identify learners' needs and weaknesses during teaching, so that they are adequately prepared for assessment of learning. In AGRIS, enacting formative assessment can enhance instructional practices, identify gaps in the AGRIS curriculum, and improve performance. There is a need for research to explore how AGRIS teachers embrace formative assessment when teaching AGRIS in secondary schools.

## **3. Theoretical framework and the PCHP framework**

This study uses Engeström's third-generation cultural-historical activity theory (CHAT) as a lens. This suitable theory encompasses an activity system (the classroom) and human activity (teachers). AGRIS teachers can implement and enact the curriculum to address the questions of "what", "how" and "why" by employing appropriate curriculum concepts. CHAT is characterised by six principles teachers should embrace in the activity system: tools (resources), subject (teacher roles), objects (knowledge - goals), rules (assessment), community (environment), and division of labour (teaching methods). However, this study personalised the principles of CHAT to address the questions of "what", "how" and "why" according to the concepts that emerged from the literature. Figure 1 depicts the PCHP framework used to denote curriculum concepts relevant to these three questions in education.

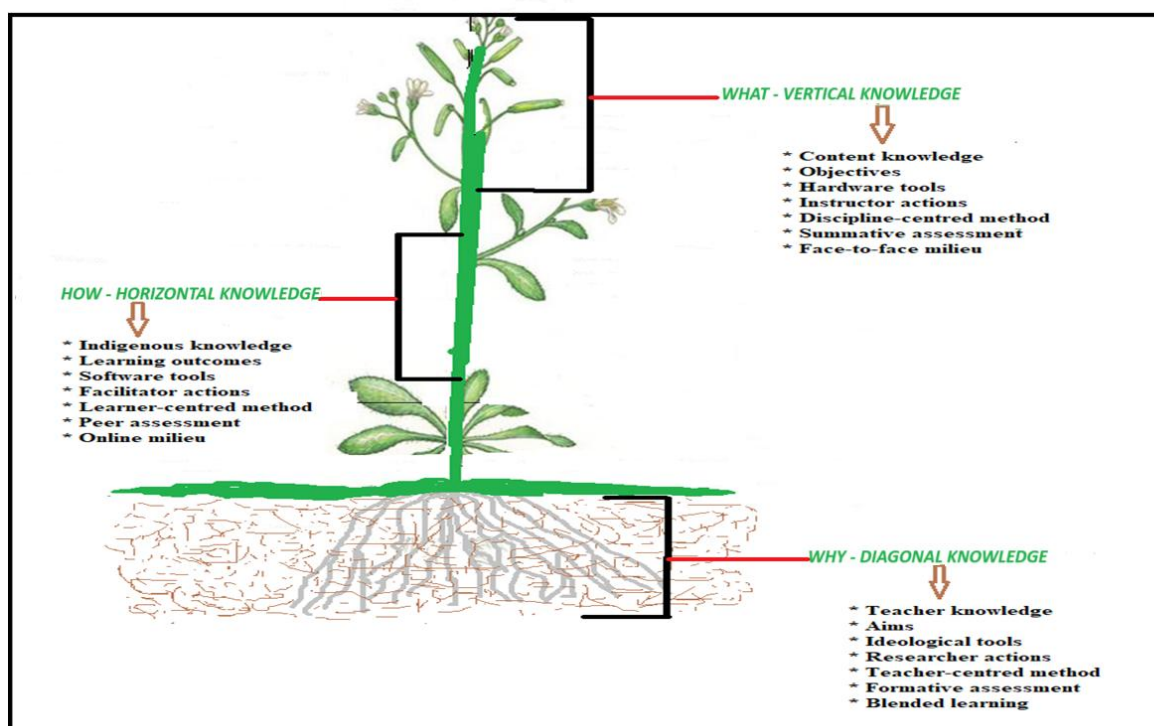


Figure 1: The PCHP framework adapted from Nduku (2022)

Figure 1 shows the curriculum concepts to address the questions of “what”, “how” and “why”, as well as the justification for them being presented as a plant. For instance, the roots symbolise the “why”: I view roots as being responsible for anchoring the plant, while ensuring successful growth. Diagonal knowledge forms a concrete foundation for building a successful learner with adequate knowledge for their career. The stem signifies the “how”: without a stem, the branches, leaves and flowers will not flourish. It plays a vital role in connecting the roots to the leaves, assisting in translocating minerals and water absorbed by various parts of the plant. A plant can effectively produce food to sustain life through its roots and its stem.

Learners may fail to understand content knowledge without indigenous knowledge, which cultivates skills among learners. The branches, leaves and flowers symbolise the “what”: flourishing of a plant is evident from the development of branches, on which green leaves and blossoming flowers grow. Branches represent holding the needs of the subject, as well as budding knowledge about the subject. A plant is declared stable, mature and complete if its roots, stem and branches are well developed.

#### 4. Methodology

The study employed a critical paradigm using action research. The critical paradigm aims to explore, critique and bring transformation to emancipate participants from the oppression imposed by their practice (Creswell, 2014). This paradigm is relevant to this study because it brings transformation, emancipating AGRIS teachers to develop learners’ capabilities, while addressing the needs of

the subject, learners and society (Cohen et al., 2013). The study had two phases of planning, action, observation, reflection and decision-making for the next phase.

Six experienced and most accessible teachers were selected using purposive and convenience sampling. Purposive sampling assisted in intentionally selecting participants with important qualities and knowledge of the purpose of the study (Cohen et al., 2011; McMillan & Schumacher, 2010). Convenience sampling was used to select the most available teachers in the vicinity, the most convenient to reach, and the most readily available to produce data (Cohen et al., 2013; Etikan et al., 2016). The researcher applied for ethical clearance from the Department of Education, and all participants signed consent letters. The consent letters contained information on confidentiality, anonymity, voluntary participation, and the benefits of participation. Pseudonyms were used instead of participants' names.

The researcher employed data generation methods that would answer the research question and that were appropriate to produce data (Cohen et al., 2013; Creswell, 2014). The study utilised four methods of establishing an in-depth understanding of the phenomenon, enhancing credibility through triangulation and ensuring the reliability of the study's findings. Reflective activities and one-on-one semi-structured interviews were therefore used. Thematic analysis was employed as an approach guided by themes adapted through communication of the data (Valsmoradi et al., 2016). Identification of patterns and themes within the findings was conducted utilising inductive thematic analysis, and deductive thematic analysis was conducted using the PCHP framework, which is consistent with CHAT principles (Braun & Clarke, 2006).

## 5. Findings and discussion

Two phases of data from reflective activities and semi-structured interviews were coded and presented according to themes that emerged from CHAT principles and the PCHP framework, for instance goals (outcomes, aims, objectives), objects (content), division of labour (teaching approaches), tools (resources), actors (teacher roles) and rules (assessment).

### 5.1 Goals (aims, outcomes, objectives)

Phase 1

Ralph:

*"I teach according to aims. Important for learners to achieve what I have been teaching them. I always aim for what my learners must achieve."*

Njinji:

*"My teaching always focuses on aims, because I always concentrate on teaching content. The CAPS document has general aims. This makes it difficult for me to formulate specific aims."*

Phase 2

Popi:

*"Agric has prescribed lesson plans with objectives. Therefore, my teaching is always based on objectives. I never paid attention to those"*

*objectives, because I used to consider them unimportant. The documents that we received from you opened my eyes."*

Hloni:

*"I always teach using objectives. I usually concentrate on objectives, because in every lesson, learners should know something, during every lesson."*

In the transformation phase (phase 2), the teachers better understood the premises that drive their teaching. However, they were still confused about how to use aims and outcomes when teaching AGRIS. This suggests that the teachers were unaware that aims, outcomes and objectives are crucial to address the questions of "how" and "why" (Clarke et al., 2020; Khoza & Biyela, 2020).

### **5.2 Objects (content)**

In both phases, the participants demonstrated adequate understanding of the content that drives their teaching. However, they all mentioned the prescribed content, which does not address the questions of "how" and "why". According to Ogbo and Ndubisi (2018) and Ahanonye et al. (2024), indigenous knowledge and traditional knowledge can address both questions.

### **5.3 Division of labour (teaching approaches)**

Phase 1

Popi:

*"I use the narrative and question-and-answer methods to get what they know."*

Hloni:

*"I employ different strategies, e.g., lecture method, allow learners to do group work or discussions, pair work, and facilitate the process. I prefer the drilling method, because of the wide scope of Agric."*

Tumelo:

*"I use demonstration, lecturing and practical work. I prefer to use my Agric period by myself, using the lecture method."*

Phase 2

Saneh:

*"It seems as if I was confused all along, because I have been using teacher-centred as content-centred. It means that I always use a content-centred approach, because it assists me in finishing my work on time."*

Tumelo:

*"By the look of things, I am always using learner-centred and content-centred approaches."*

The transformation phase (phase 2) showed a remarkable improvement. For instance, in phase 1, all the participants mentioned the lecture method, the question-and-answer method, demonstrations and group work as their teaching

approaches. However, teachers lack understanding of teaching strategies that address skills (“how”) and values/attitudes (“why”). According to Logenswaran et al. (2021) and Lau (2020), learner-centred and teacher-centred approaches can address both questions.

#### **5.4 Tools (hardware, software and ideological-ware resources)**

##### Phase 1

Ralph:

*“I use teaching aids such as chalkboard, textbooks, worksheets, previous question papers, Farmer’s Weekly and a laptop. Sometimes I use printed slides for learners, because we do not have a data projector at school.”*

Hloni:

*“I use video clips, ATP [annual teaching plan] and CAPS documents.”*

Saneh:

*“I use my laptop, Focus and Viva textbooks, previous question papers, chalkboard, ATP and CAPS document.”*

##### Phase 2

In phase 2, more teachers indicated textbooks, the chalkboard, past examination papers, the ATP and the CAPS document as their daily-use tools. The responses of the teachers suggest that hardware tools are most prevalent in teaching AGRIS and in addressing knowledge, rather than skills and values/attitudes. However, the literature suggests that teachers can only utilise software and ideological-ware tools to address the questions of “how” and “why” (Sokhulu, 2023; Zuma & Mthembu, 2023).

#### **5.5 Actor role (teacher role: instructor, facilitator, scholar)**

The diagnostic stage of this action research (phase 1) did not indicate how some teachers act when teaching AGRIS. However, during observation, it was apparent that the teachers act as instructors:

Popi:

*“I use an instructional method, where I instruct and learners do as I say, and sometimes allocate some work to do in groups.”*

Saneh:

*“I use the lecture method. It works for me perfectly. In my class you will not hear any noise. Learners are used to being quiet and listening to my teaching.”*

Njinji:

*“During the class period, I use the instructional method, but during the weekends, I use the monitoring method, because that is where my learners get time to discuss issues that concern them about the subject matter taught during the week.”*

In the transformation stage, the teachers were clear about their teaching actions. They all mentioned that they act as instructors in their respective classrooms, which mainly addresses the needs of the subject (scientific knowledge). This

suggests that the role played by the teachers does not address the questions of “how” and “why”. According to Khoza (2019a) and Martin et al. (2020), the facilitator and researcher roles are appropriate to address these questions.

### **5.6 Rules (assessment: summative, formative and peer assessment)**

#### Phase 1

All the participants indicated using informal assessment (homework, classwork, class tests) and formal assessment (examination papers from the province, and tasks from their different clusters) to ensure that learners obtain adequate knowledge. It was not clear in the diagnostic stage that the teachers better understood the premises behind informal and peer assessment. This was evident from their responses. None of the participants indicated using all three types of assessment.

#### Phase 2

Popi:

*“I also give them assignments in the form of scientific research.”*

Tumelo:

*“Every day I give them homework or classwork using questions from their textbooks or previous question papers.”*

Hloni:

*“I give them four activities per week as per our subject policy.”*

Saneh:

*“I always avoid giving them group work, because I do not want them to copy each other’s work.”*

The transformation stage revealed many differences from the diagnostic stage. The teachers showed understanding of the premises behind the different forms of assessment, although they seemed confused. For instance, they all thought that informal (formative) assessment consists of homework, classwork and class tests. However, Widiastuti et al. (2020) argue that informal assessment is rooted in teacher knowledge and beliefs about the subject and does not pertain to certain types of documents. Informal assessment calls for intensive professional development on why and how formative and peer assessment should be enacted.

## **6. Conclusion and recommendations**

The discussion and analysis of the generated data was rooted in CHAT principles (goals, objects, division of labour, tools, actor roles and rules) but personalised using the PCHP framework. The findings indicate that influences from disseminating (scientific) knowledge dominate AGRIS teaching, while development of skills and values/attitudes is neglected. The teachers were unaware of all the concepts underpinning dissemination of scientific knowledge (the question of “what”). AGRIS teachers are thus not focusing on curriculum concepts that address the questions of “how” and “why” in their pedagogical practice. However, this study managed to transform and emancipate the teachers who participated. The above discussion suggests that AGRIS teachers in South

Africa are not exposing learners to principles essential for agricultural production in the country. This is attributed to the performance-based curriculum, which fails to assist learners in developing skills and abilities required for agricultural production. Furthermore, this curriculum fails to develop learners' interests and awareness of opportunities in the agricultural sector, as well as their understanding of agriculture and its importance to households nationwide.

The study underscores that the AGRIS school curriculum should equip learners with adequate knowledge, skills and values/attitudes. However, South Africa's CAPS document does not stipulate the curriculum concepts teachers should implement and enact when teaching knowledge, skills and values/attitudes. The researcher proposes that the PCHP framework can transform and improve AGRIS practice, because it focuses on appropriate curriculum concepts for addressing and balancing any curriculum.

The framework can provide teachers with an in-depth understanding of curriculum concepts that underpin AGRIS in their practice. Curriculum developers in South Africa should include curriculum concepts that address the questions of "how" and "why", and they should conduct professional workshops to equip teachers on how to enact those concepts in their practice. This will enable teachers to produce competent citizens with the knowledge, skills and attitudes required in the workplace.

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