Enhancing direct instruction through an adapted K-W-L strategy

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ABSTRACT

Observations of pre-service teachers (PSTs) conducting Direct Instruction (DI) lessons reveal low levels of learner engagement, with instruction remaining predominantly teacher-centred. This conceptual pedagogical paper proposes a modification of Ogle's (1986) Know-Want-Learned (K-W-L) strategy, reformulated as K-W-L in Direct Instruction (K-W-L in DI). This is intended to help PSTs bolster learner engagement and implement inclusive teaching practices when using DI as a teaching strategy. Incorporating the K-W-L framework into DI activates learners' prior knowledge, promotes alignment with the lesson objective through structured teacher questions, and provides means for reflective learning through formative assessment. The K-W-L strategy in the DI framework can support differentiated instruction and scaffold learning within Vygotsky's Zone of Proximal Development. Although numerous adaptations of the original K-W-L strategy have been applied across disciplines to improve comprehension of expository texts, K-W-L in DI uniquely positions the K-W-L chart as an instructional tool within direct teaching. The three sections of the K-W-L chart facilitate the organisation of lessons into three phases: before, during, and post-engagement with new material. These three sections align, respectively, with the introduction, development (body), and consolidation stages of a DI lesson. This alignment enables the K-W-L chart to function as a structured scaffold for guided learning when utilising the DI teaching strategy. The proposed framework embeds teacher-generated questions, grounded in Bloom's revised taxonomy, to facilitate differentiated instruction and sustained learner participation throughout the lesson. This study underscores the value of preparing future teachers to use K-W-L in DI as both a planning and instructional medium to improve student engagement and inclusive teaching practices when presenting DI lessons.

1. Introduction and Background

Globally, initial teacher education programmes expect PSTs to engage in work-integrated learning (WIL) or teaching practice, by presenting lessons in authentic school contexts for a period of time (Chou, 2019). In South Africa, WIL is a compulsory component of initial teacher education programmes (Department of Higher Education and Training, 2015), in which PSTs deliver lessons in schools. Pre-service teachers are guided to facilitate lessons using various teaching strategies, including direct instruction (DI). In the context of this paper, DI is regarded as a teacher-led strategy for sharing new information on a particular topic within a subject when teaching a group of learners.

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In our feedback sessions as teacher educators about PSTs' implementation of DI, three main areas of concern emerged. The first concern is that most DI lessons are presented in a lecture format, in which learners are mainly passive, except when answering questions posed by the teacher. The second concern is that the use of teaching media is often limited or absent. Teaching media refers to any material, such as pictures, objects, video clips, or graphic organisers, used during lesson facilitation to attract learners' attention and curiosity to learn, and to support their comprehension of information presented to them or with which they interact (Ordu, 2021). Teaching media, whether the latest technological advances or handmade media, should serve to support learners' learning. Thirdly, there is a concern that many PSTs do not account for learner diversity when planning lessons. These pitfalls remain, even though they are regularly addressed with PSTs. There is a need to develop ways for PSTs to enhance learner engagement, incorporate teaching media, and consider learner diversity when utilising DI.

This conceptual pedagogical paper proposes an adaptation to Ogle's (1986) K-W-L reading strategy. This K-W-L variant proposes using Ogle's (1986) K-W-L framework when presenting lessons that employ the direct instruction teaching strategy. Thus, this variation is called K-W-L in Direct Instruction (K-W-L in DI). The aim of the paper is thus to suggest how PSTs can employ the K-W-L strategy in DI during WIL to facilitate active learner engagement, scaffold learning, and develop critical thinking when presenting DI-based lessons. This raises the question: How can the K-W-L in DI enhance learner participation, provide learning support, and develop learners' critical thinking skills when PSTs deliver DI lessons during WIL?

The theoretical framing of the paper is followed by an explanation of Ogle's K-W-L (1986) as a reading strategy. The criteria for employing direct instruction are elucidated. A description of the newly proposed K-W-L in DI is provided. This is followed by a discussion of the correlation among the K-W-L in DI, the phases of a DI lesson, and the theoretical framework that augments learner engagement, contributes to learners' critical thinking, and serves as a form of learning support.

2. Theoretical Framework

A constructivist philosophy underpins the approach to teaching and learning in South African learning institutions. Therefore, Vygotsky's socio-constructivist theory is used to frame this paper.

The constructivist philosophy advocates a classroom environment where learners utilise and adapt (where necessary) their prior knowledge to construct new knowledge (Schur & Guberman, 2024). Teachers do not merely transmit information to learners, but support learners to "form conceptualisations that fit accepted knowledge within their culture", through their engagement in class activities (Jaworski, 1994; Schur & Guberman, 2024: 46). Learners actively co-construct their understanding and knowledge through active participation in the teaching and learning process (Adams, 2006; Jaworski, 1994; Killen & Hattingh, 2022). Learners' active participation in lessons is imperative within a constructivist-guided classroom. Teachers can use learners' responses to adapt their support and guidance (Jaworski, 1994).

It is vital to implement teaching strategies that scaffold learning, where the teacher and learners are active co-participants in the teaching and learning process (Agustin, Wahyudin & Isnaini, 2021; Guthrie, Wigfield & Perencevich, 2004). According to Mahan (2022), there are different conceptualisations of scaffolding. In this paper, scaffolding is linked to Vygotsky's zone of proximal development (ZPD), where learning support is provided by the teacher or a more knowledgeable other to assist learners in building comprehension of information or in performing a skill. Miller (2011:121) points out that "The distinctive feature of school learning and the zone of proximal development is

that the child receives instruction in what he cannot yet do, and this is the defining feature of the relationship between instruction and development." The implication is that the additional support, provided through social interaction and communication between the teacher and learner(s), enables learners to achieve at a higher level (Jaworski, 1994). Scaffolding within the ZPD serves as a form of learning support for learners (Shvarts & Bakker, 2019).

Scaffolding thus contributes to teachers' accommodation of learners' diverse learning styles and needs within the teaching and learning context. It supports inclusive teaching practices. Inclusive teaching practices should be infused into classroom teaching and not regarded as additional special-needs teaching sessions for learners experiencing barriers to learning. All teaching should be inclusive and support and encourage all learners to participate in, and learn from, the teaching and learning process. The teacher's support should, over time, benefit learners' cognitive development and independent learning.

Learning through a constructivist lens involves focusing on thought processes and respecting alternative interpretations, while encouraging critical thinking through stimulating questions (Adams, 2006). Constructivism requires a classroom that encourages learning through learner-learner and learner-teacher interactions that respect and explore thought processes (Adams, 2006).

3. Literature Review

3.1. The Original K-W-L Strategy

Donna Ogle (1986) designed the Know, Want, Learned (K-W-L) strategy to activate learners' prior knowledge, establish a reading purpose, and assess learning of expository text. Ogle (1986) describes the K-W-L as a versatile reading strategy that stimulates learners' thinking before, during, and after reading. Figure 1 provides an example of a K-W-L chart used by learners to read an expository text to learn about 'The Nile River'. A description of the original use of the K-W-L as a reading strategy then follows.

Figure 1 *The K-W-L chart when using the K-W-L reading strategy*

Topic: Ancient Egypt: The Nile

Lesson Objective: At the end of the lesson, learners should be able to utilise the K-W-L strategy to read an expository text about the Nile River, and provide written answers to learner-generated questions.

K (what I KNOW)	W (what I WANT to know)	L (what I LEARNED)
Learners list keywords related to what they know about the topic.	Learners set their own questions related to what they would like to learn about the Nile River	Learners write the answers to the questions listed in W-column.
pyramids		
North Africa		
desert		
Nile (longest)		
pharaohs		
hieroglyphics		

sphinx

The three-columned K-W-L chart encourages learners to: recall prior knowledge by declaring what they already 'Know' in the K-column, write down self-generated questions to clarify what they 'Want' to know in the W-column, and indicate what they have 'Learned' by recording their answers in the L-column (Ogle, 1986).

The K-column is designed to activate learners' prior knowledge on a specific topic (Ogle, 1986). This allows the teacher to formatively assess learners' prior knowledge of the topic and clarify any misconceptions (Ogle, 1986). Learners are then encouraged, through modelling, scaffolding, and discussion, to categorise the keywords in the K-column. Figure 2 presents an example of categories created from the keywords in the K-column, related to the topic 'Ancient Egypt: The Nile'.

Figure 2 *Categories derived from the K-column*

Categories derived from K-column		
Civilization and Society	**Monument / Structures**	**Geography**
• pharaohs	• pyramid • sphinx • hieroglyphics	• North Africa • Nile River • Desert

Learners move on to the second column (W-column). They record their questions about what they would like to learn about the Nile River. Learner-generated questions set a purpose and motivation for reading (Ogle, 1986).

Learners read the text on the Nile River and record the answers to their questions in the L-column to record what they have learned. The L-column plays a crucial role in informal formative assessment to address any learner misconceptions (Cantrell, Fusaro & Dougherty, 2000). Thus, the L-column offers a summary of the learner's learning. It helps showcase the interplay between existing and fresh insights, fostering deeper understanding and enhancing cognitive engagement. Questions not addressed in the text create the opportunity for learners to extend their inquiry through self-directed learning.

The K-W-L has proven versatile and effective across diverse educational settings, leading to enhanced comprehension, motivation, and metacognitive awareness (Ogle, 1986). A qualitative study conducted in Palembang, Indonesia by Fitriani, Tahrun, and Firdaus (2025) concurs that the K-W-L strategy results in significant improvements in reading comprehension, learner participation, and motivation.

The K-column places learners at the centre of the crucial initial step in learning: activating their prior knowledge. Active learner engagement and motivation are fostered when learners record their self-generated questions in the L-Column. Learner awareness of what they have learned is the focus of the L-column. Questions that the reading text does not answer provide an opportunity for learners to engage in extended self-directed learning. Throughout the use of the K-W-L, the teacher is present to guide and support learners in their learning. Thus, Ogle's (1986) K-W-L strategy is framed within the social constructivist perspective as it is learner-centred, provides for scaffolding (an inclusive teaching practice) within the ZPD, and stimulates learners' critical thinking through learner-generated

questions. There have, however, been adaptations to the original K-W-L (Ogle, 1986), to suit differing contexts.

3.2. Variants of the K-W-L

Carr and Ogle (1997) add mind-mapping to the K-W-L to support high school learners' comprehension of expository texts. This adaptation, named the K-W-L Plus, encourages keywords from the L-column to be plotted on a mind-map. Sippola (1995) added an S-column for learners to indicate what they still need to learn. The K-W-L-S was found to encourage primary school learners to pursue self-inquiry (Sippola, 1995). In Serbia, Bogdanović, Stanisavljević, Rodić, Rončević and Zouhor (2022) used a modified K-W-L, the TQHL (Think, Question, How, Learn) chart to teach physics to Grade 6 learners. Their findings indicate increased learner metacognition, which promoted scientific inquiry and self-regulation among learners (Bogdanović et al., 2022).

Research on the K-W-L and its variants has not been limited to samples of school learners. Studies involving English as a Foreign Language (EFL) university students in Indonesia reported improved comprehension and reading attitudes when combining K-W-L with peer tutoring (Rahmasari, Munir, & Nugroho, 2024). Diasti, Murniati, and Hartono (2023) reported improvements in university students setting reading goals and monitoring their comprehension and learning. Furthermore, a mixed-methods investigation on the pedagogical use of K-W-L charts involving teachers, PSTs, and nine- to eleven-year-old learners, was conducted in Northern Ireland (Greenwood, 2018). The research revealed that the strategy enhanced learner engagement, motivation, interest, and enjoyment, and also created a sense of ownership over learning (Greenwood, 2018). These studies feature K-W-L and its variants as tools for enhancing learner participation, developing comprehension skills, and metacognition across various academic levels and content areas.

This article proposes another variant of Ogle's (1986) K-W-L, namely, the K-W-L in Direct Instruction (K-W-L in DI). K-W-L in DI suggests a way to minimise challenges that PSTs typically encounter when implementing DI during WIL. An overview of DI is followed by an explanation of the proposed K-W-L in DI.

3.3. Direct Instruction

Direct instruction (DI) is described as explicit, teacher-directed "expository teaching" in which the teacher presents information to learners (Rosenshine, 2012: 1; Killen & Hattingh, 2022: 138; Shammas, 2023). Rosenshine (2012) warns, however, that the term Direct Instruction should be carefully clarified to avoid confusion. Rosenshine (2012: 1) identifies the following five descriptions of DI:

1. Academic instruction that is led by a teacher, regardless of the quality of instruction.
2. The instructional procedures used by effective teachers in the teacher effects research.
3. Instructional procedures used by teachers when they teach cognitive strategies to students.
4. Instructional procedures used in the Distar (Direct Instruction Systems in Arithmetic and Reading programs).
5. Instruction portrayed in negative terms, such as settings where the teacher lectures and the students sit passively.

Typically, PSTs from the author's institution prepare DI lessons by selecting lesson content, setting lesson objective(s), deciding on lesson pacing, leading explanations, and determining the concluding informal assessment activity for learners to complete. Description five (5) above by Rosenshine

(2012: 1) relates to the observations noted when PSTs (from the institution where the author works) present DI-based lessons during WIL. Some disadvantages are associated with DI.

3.3.1. Disadvantages of DI

Traditionally, DI is associated with a transmission model of teaching, in which information flows from the teacher to learners and learners are positioned as passive recipients of information (Dubinsky & Hamid, 2024). A negative connotation is associated with DI where "... the teacher lectures and students sit passively" (Rosenshine, 2012: 1). Learners become disinterested and bored if they are not actively involved in the lesson in some way (Killen & Hattingh, 2022; Rosenshine, 2012).

Another negative is that DI relies heavily on learners listening to the teacher's explanations, narration, or descriptions, thereby favouring learners with a predominantly auditory learning style. It is imperative for teachers to engage all learners in the lesson as much as possible by catering to visual, kinesthetic, and tactile learners.

Another concern that arises is the possibility that only the teacher's perspective is presented to learners (Killen & Hattingh, 2022). Teachers should provide time for learners to ask questions and share their viewpoints during DI lessons.

Teacher-led questioning generally dominates direct instruction lessons. Effective questioning by the teacher can contribute to learner engagement and serve to monitor learners' understanding of the content presented. However, learner-generated questioning should be encouraged during DI. When learners are encouraged to regularly construct their own questions on the topic, their critical thinking skills are developed (Spencer, Causey, Ernest, & Barnes, 2020). Despite some negative aspects being associated with DI, it is an appropriate teaching strategy under particular circumstances.

3.3.2. Advantages of DI

DI can be effective when the teacher seeks to activate learners' prior knowledge and actively engages learners in the lesson (Killen & Hattingh, 2022). DI is appropriate when learners' attention needs to be focused on specific information that directly aligns with the lesson objective(s), when the content is new to learners, when learners possess limited prior knowledge on the topic, or when time constraints are evident (Killen & Hattingh, 2022; Orlich, Harder, Callahan, Trevisan & Brown, 2010). Time constraints are often a reality in the South African context. This is due to the amount of content indicated in the Annual Teaching Plans issued by the South African Department of Basic Education that teachers are under pressure to 'cover' (Bertram, Mthiyane & Naidoo, 2021: 1; Hoffman & Maarman, 2024).

Additional challenges impact teaching and learning in some South African schools. The challenges relate to overcrowded classrooms, insufficient resources (including textbooks, for example), a lack of Information and Communication Technology (ICT), limited facilities like libraries and/or science laboratories, and absent or intermittent electricity supply (Mokgwathi, Graham & de Villiers, 2023; West & Meier, 2020). Teachers might find it best to employ DI when considering these potential extrinsic barriers to teaching and learning.

The use of DI ensures that all learners in class are exposed to the same content. The strategy is suitable for teaching diverse learners as well as large and small class sizes. Additionally, the strategy is well-suited to support learners who find it challenging to read expository texts independently. An advantage of direct instruction is that the teacher can apply informal formative assessment and immediate feedback to learners throughout the lesson. Misconceptions or misunderstandings can be minimised in this way.

The proposed use of an adapted K-W-L in conjunction with DI appears to present a theoretical contradiction. The way in which the proposed K-W-L in DI mitigates this contradiction is provided after the explanation of the K-W-L in DI.

4. K-W-L in Direct Instruction (K-W-L in DI)

The use of an adapted K-W-L is presented, taking into account previously noted contextual factors such as inadequate resources, overcrowded classrooms, and intermittent electricity supply in some South African schools. The K-W-L in DI, used in the context of a DI-based history lesson on the topic of "Egypt: The Nile River," is illustrated in Figure 3. In this example, the K-W-L in the DI chart serves as a framework for learners to recall prior knowledge (K-column), use teacher-generated questions set across the cognitive levels of Bloom's taxonomy to establish the goal for listening to information (W-column), and consolidate and summarize information (L-column).

Figure 3 *The K-W-L in the DI chart*

Topic: Ancient Egypt: The Nile

Lesson Objective: At the end of the lesson, learners should be able to complete a K-W-L chart by writing the keywords that can be used to answer questions on to the Nile River.

LESSON INTRODUCTION	BODY OF LESSON	LESSON CONCLUSION
K (what I KNOW) (Keywords from learners)	W (what I WANT to know) Teacher-/learner-generated questions	L (what I LEARNED) (Answers - keywords)
pyramids North Africa desert Nile (longest) pharaohs hieroglyphics sphinx	1.	Lake Victoria, Uganda
	2.	Fertile soil, crops, food
	3.	Water - crops, animals, cleaning, cooking, fishing, sailing, transportation
	4.	Farming - water, crops, fish, survive) Transport - materials, build, trade
	5.	Water – life
	6.	Settlement, water – food, trade, transport, pyramids, temples, cruises, tourism
	OWN QUESTIONS	

4.1. Teaching Media

In school contexts with limited or absent resources, such as data projectors, electronic white boards, or electricity supply, teachers can create their own teaching media (teaching aids). Figure 4 shows an example of a partially completed K-W-L chart, word cards, and sentence strips created by a teacher. It is used in conjunction with an appropriate visual stimulus on the topic – in this example, an image

of the pyramids and Sphinx (Figure 5) to introduce the lesson on 'Ancient Egypt'. The K-W-L in DI chart, word cards, sentence strips, and pictures serve as teaching media in the absence of technology, such as a data projector or interruptions to the electricity supply.

The teacher predicts the answers (prior knowledge) that learners are likely to provide and prepares relevant keywords as word cards when preparing the lesson. The word cards can serve as teaching media to draw learners' attention to keywords (prior knowledge) and to display it. The word cards save time as the teacher does not need to write each keyword under the K-column. However, unforeseen keywords provided by learners can be written in the K-column. Learners see and hear the keywords, thereby accommodating both auditory and visual learning modalities.

The question strips are tangible paper strips on which the pre-planned teacher-generated questions are recorded. These question strips help draw learners' attention to each question and, thus, serve as a form of teaching media.

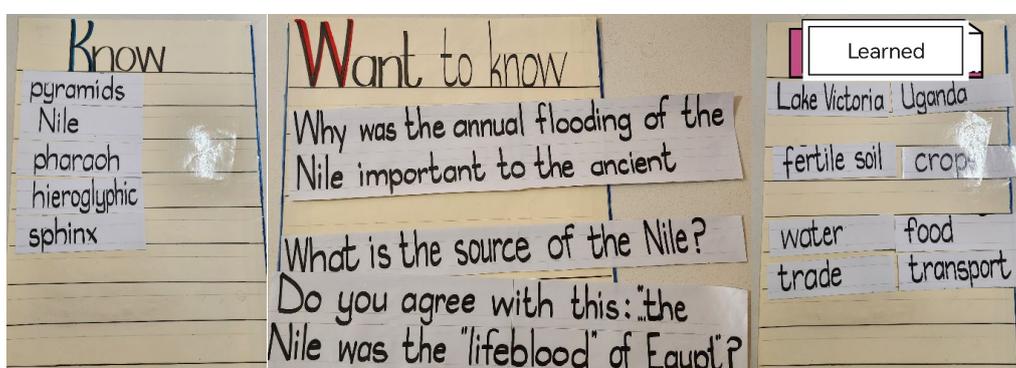**Figure 4** *The K-W-L in DI chart with word cards and question strips*

Figure 5 *Image of pyramids and Sphinx*

4.2. The Introduction and K-Column

When introducing the lesson, the teacher draws learners' attention to a picture of the pyramids and the Sphinx at Giza (Figure 5). The teacher prompts learners to recall and articulate their prior knowledge of the topic, recording and displaying their answers in keyword format in the K-column (Figures 3 and 4). (Examples of alternatives to the picture as teaching media are a short video clip, an auditory snippet, or objects associated with Egypt).

During the introduction, the K-column enables teachers to activate learners' prior knowledge (Ogle, 1986), capture learners' attention, stimulate curiosity, and link to the lesson objective(s). The opportunity for formative assessment and scaffolding within the classroom is created (Jaworski, 1994; Schur & Guberman, 2024).

4.3. The Body of the Lesson and the W-Column

The teacher-selected content aligned to the lesson objective(s) is presented to learners during the body of the DI-based lesson. The traditional transmission model of DI often frames the teacher as the information transmitter, with learners as passive recipients. In the K-W-L in DI, teacher-generated questions are displayed in the W-column. The use of teacher-generated questions in the K-W-L in DI deviates from Ogle's (1986) K-W-L. In Ogle's (1986) K-W-L, learners generate questions before they read expository text. Learners' generation of questions is an important aspect of learning. For this reason, the K-W-L in DI includes a space for learners to add their own questions to the W-column. Table 1 depicts the teacher-generated questions, set across the cognitive levels of Bloom's taxonomy, to be placed in the W-column of the K-W-L in DI chart (Figure 3).

Table 1 *The W-column of the K-W-L in DI chart*

BODY OF LESSON
W (WANT to know) - Teacher-generated questions [Bloom's taxonomy]
1. Where does the Nile River originate (start, source)?
2. Why was the annual flooding of the Nile River important to ancient Egyptians?
3. If you were an ancient Egyptian farmer, how would you use the Nile River in your daily life?
4. What are two different ways the Nile River helped ancient Egyptians, and how are they related?
5. Do you agree with the statement that the Nile was the "lifeblood" of Egypt? Why or why not?
6. Design a travel brochure that highlights the historical and modern importance of the Nile River. What key features would you include?
OWN QUESTIONS (Learner-generated questions)

The teacher-generated questions placed in the W-column (Figure 3 and Table 1) align with the lesson objective. The questions can be structured from the lowest to highest cognitive levels according to Bloom's revised taxonomy, namely Remember, Understand, Apply, Analyse, Evaluate, and Create (Krathwohl, 2002). Addressing one question at a time helps break the material into sections (chunking), allowing time for explanations, questioning, clarification of misunderstandings, and for learners to ask questions.

Learners are encouraged to read the questions either individually, in pairs, or in small groups. Learners answer or attempt to answer each question. The teacher further elaborates on the learners' answers, using DI to provide information they might have missed. The answers are placed in the Learned column as keywords or phrases (Figure 4).

As with column-K, the answers can be pre-planned using word cards or phrase strips that are easy to display. Learners' attention is drawn to the next question in the W-column, and the process is

repeated. Teaching media, such as relevant pictures or short video clips, could accompany the explanations.

The W- and L-columns serve as vehicles for sequencing and presenting content in manageable sections. They guide comprehension through teacher- and learner-generated questions. Additionally, the questions prompt higher-order thinking when aligned with Bloom's revised taxonomy. In this phase, social constructivist principles become evident as learners engage in knowledge building within their ZPD, supported by teacher mediation and scaffolding (Shvarts & Bakker, 2019; Adams, 2006).

For greater alignment with constructivism, I suggest that the teacher employ Socratic questioning rather than directly explaining the information to learners. Utilising Socratic questioning can encourage critical thinking (Paul & Elder, 2008) among learners, prompting them to voice their views and thus enhancing learner dialogue and agency in the lesson.

The teacher encourages learners to formulate their own questions related to the topic, which are placed in the 'Own Questions' section (Figure 3 and Table 1). These are questions that might occur to learners during the lesson. Questions can be added to this section of the K-W-L in the DI chart during any phase of the lesson, although it is likely that learners will add questions while interacting between the K- and L-columns. Generating their own questions helps learners to develop their critical thinking and encourages their motivation to learn (Ness, 2015). Learner-generated questions might need additional research and time to address. Learners should be encouraged to participate in self-directed learning to discover the answers. It is important for the teacher to follow up on the unanswered questions in the next lesson.

Once the questions have been answered, the L-column serves as a summary of the lesson. The keywords can be reused during a revision session. One idea is to remove the keywords (word cards) from the L-column and randomly assign them to different learners. Learners answer the revision questions and place the appropriate word card in the L-column to reconstruct the summary. Another idea, based on the K-W-L Plus (Carr & Ogle, 1997), is to use keywords (word cards) to construct a tangible mind map as a lesson summary.

4.4. Balancing the Seeming Theoretical Contradiction

As stated previously, DI is traditionally associated with the transmission model of teaching, whereas the K-W-L strategy is framed within the transactional model and aligned to the social constructivist perspective (Dubinsky & Hamid, 2024; Killen & Hattingh, 2022; Rosenshine, 2012). The use of the transactional K-W-L within a transmission model, such as DI, appears contradictory. However, the seeming contradiction is mitigated when the adapted K-W-L framework is deliberately incorporated into DI.

While core features of DI, such as clear objectives, sequenced content, and explicit modelling, are retained, the K-W-L structure repositions learners as co-constructors of meaning rather than passive recipients of information. In this way, the K-W-L framework functions as a mediating tool that reshapes the DI teacher-centred strategy to reflect the interactive and participatory character of a constructivist classroom.

The K-W-L model in DI, as shown in Figure 6, illustrates how it can support the structured flow of a DI lesson while embedding social constructivist principles that foster learner engagement, critical thinking, and inclusive classroom practice.

Figure 6 *Model of the K-W-L in DI*
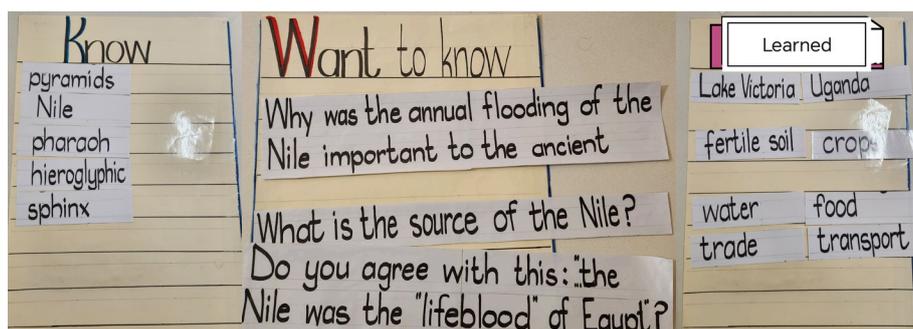
In a typical teacher-centred DI introduction, the teacher announces the topic and objective, and perhaps asks a few recall questions, and then moves quickly into explaining the new content. With K-W-L in DI, the K-column serves to stimulate the constructivist process of activating, acknowledging, and purposefully using learners' prior knowledge as the starting point for new learning. Consequently, the initial "content" displayed (K-column) is generated by the learners themselves rather than by the teacher.

The teacher formatively assesses learners' prior knowledge and guides and scaffolds learning within the ZPD. The latter contributes to inclusive teaching practices. The introduction becomes an interactive process (learners speak, listen to one another, and negotiate meaning) in which learners see their contributions displayed on the chart. Thus, the introductory phase shifts from the teacher introducing the topic to the class surfacing what they already know, while the teacher refines it. DI remains teacher-led at the planning level, but epistemic authority is shared at the interactive classroom level because learners' prior knowledge shapes how the lesson unfolds.

Learner autonomy is likely to increase when K-W-L is implemented in DI. Learners experience themselves as contributors whose existing knowledge matters when the K-column is used to assess and foreground their prior knowledge as the legitimate starting point to lessons. Learners gain a sense of ownership of the content as they see their keywords and associations displayed in the K-column. They can monitor how their initial conceptions are confirmed, refined, or challenged during the lesson. Autonomy is further supported when the teacher explicitly invites multiple perspectives and treats divergences in prior knowledge as resources for inquiry, rather than errors to be eliminated.

In a conventional DI body of the lesson, the teacher presents content in chunks, asks mostly teacher-generated questions, while learners mainly answer or take notes. The K-W-L in the DI framework retains the idea of structured, sequenced input, but uses the W- and L-columns to build cyclical learner involvement around each content segment.

Teacher-generated questions are designed to align constructively with the lesson objective and Bloom's revised taxonomy. However, the teacher-generated questions create a shared roadmap toward the lesson objective. Socratic questioning has the potential to stimulate learners' inductive reasoning, scaffold the construction of their own understanding of the answers in the W-column, and enhance learner dialogue and agency.

Learners are encouraged to add their own questions. This implies that the informational agenda is partly co-constructed as learners' curiosities and uncertainties become legitimate drivers of the information to be addressed. Learner-generated questions, encouraged during the body and conclusion of the lesson and captured across the W- and L-columns, legitimise learners as questioners. It invites learners to interrogate information rather than accept it uncritically. As learners generate their own questions, they develop individual purposes for learning within the broader lesson

objective. This process of learners generating questions can support the development of critical thinking and a sense of ownership over the learning process, which further contributes to learner autonomy.

As learners and the teacher collaboratively articulate answers, the teacher captures these as concise keywords or phrases in the L-column. Learners are required to explain, justify, and refine their answers, making their reasoning visible and creating opportunities for peer contributions and debate. Learners are repeatedly positioned as thinkers or active meaning-makers, not passive recipients of content framed by the W-column (what we want to know) and the L-column (what we learned). The linear course of DI is broken into interactive cycles of prediction, explanation, questioning, and consolidation, which is consistent with socio-constructivist views of learning as socially mediated.

Throughout all phases, the K-W-L in DI structure facilitates ongoing formative assessment. In the introduction, the K-column makes learners' prior conceptions visible and allows misconceptions to be explored. Similarly, during the body and conclusion, the W- and L-columns provide repeated opportunities to check and refine understanding. In this way, K-W-L in DI supports scaffolding within learners' zones of proximal development.

The K-W-L in the DI framework can bolster inclusive teaching practices when used strategically. Teacher-generated questions in the W-column can be differentiated by deliberately aligning them with varying cognitive levels, for example, through Bloom's taxonomy, thereby catering to learners functioning at different levels of cognitive demand. Varying the modes through which learners respond (verbally, in writing, or via images and other representations) further extends opportunities for meaningful participation. At the same time, carefully designed higher-order questions and tasks can progressively expose and scaffold learners towards more complex thinking. In this way, K-W-L in DI reconciles a teacher-centred strategy (DI) with social constructivist principles, allowing for more equitable and differentiated participation in classroom learning.

The completed K-W-L chart, delivered verbally or as a learner-produced product, allows the teacher to assess learners' attainment of the lesson objective(s) formatively. Subsequently, it informs whether reteaching or learning support provision is required. The ideal is for learners to utilise the K-W-L in the DI framework to guide their independent learning. This would require their regular exposure to the K-W-L in the DI framework. The teacher gradually scaffolds learners to independently apply the K-W-L strategy within the DI framework to process and critically evaluate the information they encounter during DI lessons.

In summary, applying K-W-L in DI promotes constructivist processes such as drawing on learners' prior knowledge, encouraging learner-generated questions, and sharing the meaning-making process. K-W-L in DI invites learners into epistemic work traditionally dominated by the teacher, who shares reasoning, questioning, and monitoring of understanding. This shifts the lesson from a simple transmission model of 'telling' towards a more transactional model of joint enquiry and discovery.

5. Conclusion

The conceptual model of K-W-L in Direct Instruction contributes theoretically by reframing a traditionally teacher-centred strategy through a socio-constructivist lens. By aligning the K-, W-, and L-columns with the introduction, body, and conclusion of a DI lesson, the model demonstrates how learner participation, questioning, and metacognitive reflection can be embedded within a structured, objective-driven format. This positioning of the K-W-L in the DI chart as both an organisational tool and an interactional scaffold extends earlier work on K-W-L as a reading support strategy (such as (Ogle, 1986; Carr & Ogle, 1987) to the domain of whole-class teaching. The K-W-L in

DI offers a theoretically grounded mechanism for integrating scaffolding and support via the ZPD into DI without abandoning its core features.

The proposed model, however, has several limitations. It is presented as a conceptual and pedagogical framework rather than the outcome of empirical intervention research. As such, its effectiveness has not yet been systematically assessed across school phases, subjects, or institutional contexts. The discussion is situated within the South African teacher education context, with a focus on pre-service teachers' work-integrated learning. This may limit direct transferability to contexts with different curriculum demands, class sizes, or resource conditions. Furthermore, the model assumes that teachers possess sufficient questioning skills, content knowledge, and classroom management capacity to implement K-W-L in DI as intended. These assumptions require empirical scrutiny.

Despite these limitations, the K-W-L in the DI model has promising applications in practice and future research. In initial teacher education programmes, it can be used as a planning template and reflective tool to help pre-service teachers design DI lessons that incorporate teaching media, scaffolded questioning, and learner-generated contributions more systematically. In school settings, the model offers a feasible way to promote more inclusive, dialogic, and cognitively demanding classroom interaction in contexts where DI is prevalent due to curriculum pressures or resource constraints. Future empirical studies could examine how the model influences learner engagement, critical thinking, and achievement. Additionally, future research can explore how pre-service teachers, in-service teachers, and teacher educators appropriate and adapt the framework across subjects, phases, and universities.

6. Declarations

6.1. Author Contributions (CRediT)

Researchers' contribution rate statement: The authorship contribution for this paper is as follows: sole authorship (100%).

6.2. Conflict of Interest

The authors declare that there is no conflict of interest to disclose

6.3. Funding Statement

The authors declare that the study received no funding.

6.4. Data Availability Statement

Data are available from the corresponding author upon reasonable request.

6.5. Ethics Approval

As a conceptual pedagogical paper, the approval by an ethics committee is not required.

6.6. Use of Artificial Intelligence (AI) Tools

During the preparation of this work, PerplexityPro was used to ascertain whether there was literature on PSTs' use of the K-W-L strategy to enhance DI-based lessons and to determine the extent of South African literature on its use in DI lessons. Writefull was used as a language editor. The free version of ChatGPT was used to cross-check whether the sources cited were present in the reference list and that sources in the reference list were cited in the text. After using the above-mentioned, I reviewed and edited the content as needed and take full responsibility for the publication's content.

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