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Review



Scaffolding what, why and how? A critical thematic review study of descriptions, goals, and means of language scaffolding in Bilingual education contexts

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ABSTRACT

In bilingual education 'scaffolding' is used to describe support that allows learners to engage with content in a language they only partially know. Much remains unclear about the ways scaffolding is conceptualized in bilingual education research. This critical thematic review uses Van de Pol et al.'s (2010) distinction between scaffolding goals and means, as well as their characteristics of scaffolding to synthesize the various forms that scaffolding of language takes in the teaching practice of subject teachers teaching in bilingual secondary education contexts. Six characteristics of scaffolding were identified. Although 'contingency' has the status of necessary condition in recent literature on scaffolding in broader educational research contexts, this is not the case in bilingual education research. The review identified six means and four goals of scaffolding and suggests that there is a hierarchy of language scaffolding goals where focusing on disciplinary literacy presupposes a focus on content and language.

1. Introduction

An increasing number of learners worldwide follow all or part of their secondary education in a second language (Mohan, Leung, & Slater, 2010; Briggs, Dearden, & Macaro, 2018). Across such contexts, supporting language development is seen as an effective way to contribute to both discipline specific content knowledge and language acquisition (Duarte, 2019; Gibbons, 2015; Hajer, Meestringa, & Tordoir, 2015; Rubio-Alcalá et al., 2019; Stanat & Christensen, 2006; Tyner & Kabourek, 2020). Within these settings, the concept of scaffolding is used to conceptualize the kind of support that allows learners to engage with content in a language they only partially know (Lyster, 2019).

The concept of scaffolding in the context of education has received a great deal of attention in the past few decades (Van de Pol, Volman, & Beishuizen, 2010; Van Leeuwen & Janssen, 2019; Puntambekar, 2021), but despite its importance in bilingual education, a lot remains unclear about the ways scaffolding is conceptualized in bilingual education research (Lo & Lin, 2019). First, it is unclear what scaffolding means in the research on contexts where teachers integrate content and language learning. Second, much is left to be desired when it comes to knowing how these kinds of scaffolds can be provided in bilingual education lessons. And third, very little is known about the reasons teachers themselves have for offering scaffolding in these contexts. These three problems together make it difficult to engage in a sustained discussion with researchers and practitioners about the various ways in which scaffolding can work in

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bilingual education. An investigation into the ‘what, why and how of scaffolding’ (Pea, 2004, p. 430) therefore seems warranted. The current review makes use of Van de Pol, Volman, and Beishuizen’s (2010) distinction between scaffolding means (‘how’) and scaffolding goals (‘why’) as well as the common characteristics in scaffolding descriptions (‘what’) that their systematic review study identified when examining a decade of research.

2. Theoretical framework

2.1. Scaffolding in Bilingual education

Throughout this paper, the term ‘bilingual education’ is used to refer to ‘classrooms where academic subjects (or “content subjects”), such as science, mathematics, geography and business studies are taught through a language which is not the first language of the students in that classroom, or at least not of the majority of the students’ (An, Macaro, & Childs, 2019, p. 166). This is particularly relevant in secondary education because subjects are generally taught by subject specialists and require higher levels of cognitive and linguistic complexity than in primary education. ‘L2’ refers to the language which is not the first language of the majority of the students in that classroom and that is used the classroom to teach subject content. Although their names differ, approaches to bilingual education around the globe such as English as a Medium of Instruction (EMI), Content and Language Integrated Learning (CLIL), Sheltered Instruction Observation Protocol (SIOP), English Language Learners in the Mainstream (ELL), English as Language of Learning and Teaching (LOLT), and Language Oriented Content Teaching (LOCT) all deal with classrooms where academic subjects are taught through an L2 (see for EMI Dearden, 2015; for CLIL Smit & Dafouz, 2012; for SIOP Echevarria, Vogt, & Short, 2016; for ELL Gibbons, 2015; for LOLT Desai, 2016; and for LOCT Hajer, 2018).

Several studies have highlighted that a focus on language is not always an integral part of subject teachers’ teaching in these different bilingual secondary school environments (An et al., 2019; Hüttner, Dalton-Puffer, & Smit, 2013; Oattes, Oostdam, De Graaff, Fukkink, & Wilschut, 2018; Tan, 2011). Furthermore, although the evidence suggests that subject teachers do not provide *enough* language support, very few studies have focused on the kinds of support that *are* provided.

The idea of teacher support is intricately connected to the idea of scaffolding (Hermkes, Mach, & Minnameier, 2018; Jia & Hew, 2021; Maybin, Mercer, & Stierer, 1992; Van Leeuwen & Janssen, 2019; Wood, 1980). Scaffolding is closely related to Vygotsky’s Zone of Proximal Development (ZPD), which is ‘the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers’ (Vygotsky, 1978, p. 86). As a term in educational theory, ‘scaffolding’ was first described by Wood, Bruner, and Ross (1976) as the ‘process that enables a child or novice to solve a problem, carry out a task or achieve a goal which would be beyond his unassisted efforts. This scaffolding consists essentially of the adult “controlling” those elements of the task that are initially beyond the learner’s capacity, thus permitting him to concentrate upon and complete only those elements that are within his range of competence. The task thus proceeds to a successful conclusion’ (Wood et al., 1976, p. 90, for an overview of the Vygotskian origin and development of the term ‘scaffolding’ see Shvarts & Bakker, 2019). Two years later, Wood, Wood, and Middleton (1978) related scaffolding specifically to language learning settings. Since then, the concept of scaffolding has become increasingly prominent within the language learning context, leading to much empirical work and theoretical debate (Hamidi & Bagherzadeh, 2018). Part of the debate stems from the broad application of the term in educational research and the ambiguity that surrounds its definition (Pea, 2004; Stone, 1998; Van de Pol et al., 2010).

In bilingual education too, scaffolding is a problematic concept (Lo & Lin, 2019). On the one hand, scaffolding has an important role in theories of bilingual education (Cummins, 2007; Echevarria et al., 2016; Gibbons, 2015; Hammond, 2012; Meyer, 2010). The notion was part of bilingual education research from very early on, as Snow, Met, and Genesee (1989) refer to the concept specifically in relation to content-based language instruction (p. 209). On the other hand, the term is used in a diffuse way in handbooks on bilingual education. A comparison between the ways scaffolding is described in three such handbooks illustrates this diffusion.

The handbooks taken as examples are Coyle, Hood, and Marsh (2010), Echevarria et al. (2016) and Gibbons (2015). All three works acknowledge the firm link between scaffolding and Vygotsky’s Zone of Proximal Development (ZPD). However, whereas the handbooks on CLIL (Coyle et al., 2010, p. 30) and SIOP (Echevarria et al., 2016, p. 129) describe scaffolding as more generic support, ELL further specifies the type of support that scaffolding entails. In her description, scaffolding is temporary support that allows the learner to later complete a task alone, making it future-oriented and focused on increasing learner autonomy (Gibbons, 2015, p. 16). Hence, although scaffolding is a central concept in CLIL, SIOP and ELL, there is no shared language to describe its properties or intentions and the ways it is used. This makes it particularly challenging to engage in a meaningful discussion about which types of scaffolding are more or less likely to lead to desired results in bilingual education. Lyster (2019) argues that scaffolding of language to help learners to develop the language needed to access academic content is essential to making bilingual education work. It is this type of scaffolding about which we still need to ask ‘what, why and how’ (Pea, 2004, p. 430).

2.2. Characteristics of scaffolding

In acknowledgement of the ambiguity of the term in educational research, Van de Pol et al.’s (2010) systematic review provides a guiding framework to analyze the ways scaffolding has been conceptualized. Their review builds explicitly on the work of Wood et al. (1976) and differentiates between scaffolding means and scaffolding goals. According to their framework, ‘means’ are the tools of scaffolding and describe ‘*how* scaffolding is taking place’ (Van de Pol et al., 2010, p. 276). The various subcategories of scaffolding means were identified on the basis of actions by teachers that were either observed by the researcher (in the case of classroom

observations) or reported by the teachers themselves (in interviews or self-reported data). ‘Goals’ are the purposes of scaffolding or ‘what is scaffolded’ (Van de Pol et al.).

Taken together, the combination of a means and a goal can constitute a scaffolding strategy if ‘the interaction is also characterized by the three characteristics of scaffolding’ (Van de Pol et al. p. 275). These characteristics are:

- *Contingency* is defined as follows: ‘the teacher’s support must be adapted to the current level of the student’s performance and should either be at the same or a slightly higher level.’ Important in this are *diagnostic strategies*, by which the teacher first determines the student’s current level of competence.
- *Fading* applies ‘when the level and/or the amount of support is decreased over time’ by a teacher.
- *Transfer of responsibility* refers to ‘the responsibility for learning [being] transferred when a student takes increasing learner control’ (pp. 274–5).

Van de Pol et al.’s overview provides a structure for analyzing scaffolding as a concept in education in a range of educational contexts. As indicated by [Lo and Lin \(2019\)](#), however, an overview of the different ways in which studies describe the goals of scaffolding in bilingual contexts appears to be lacking.

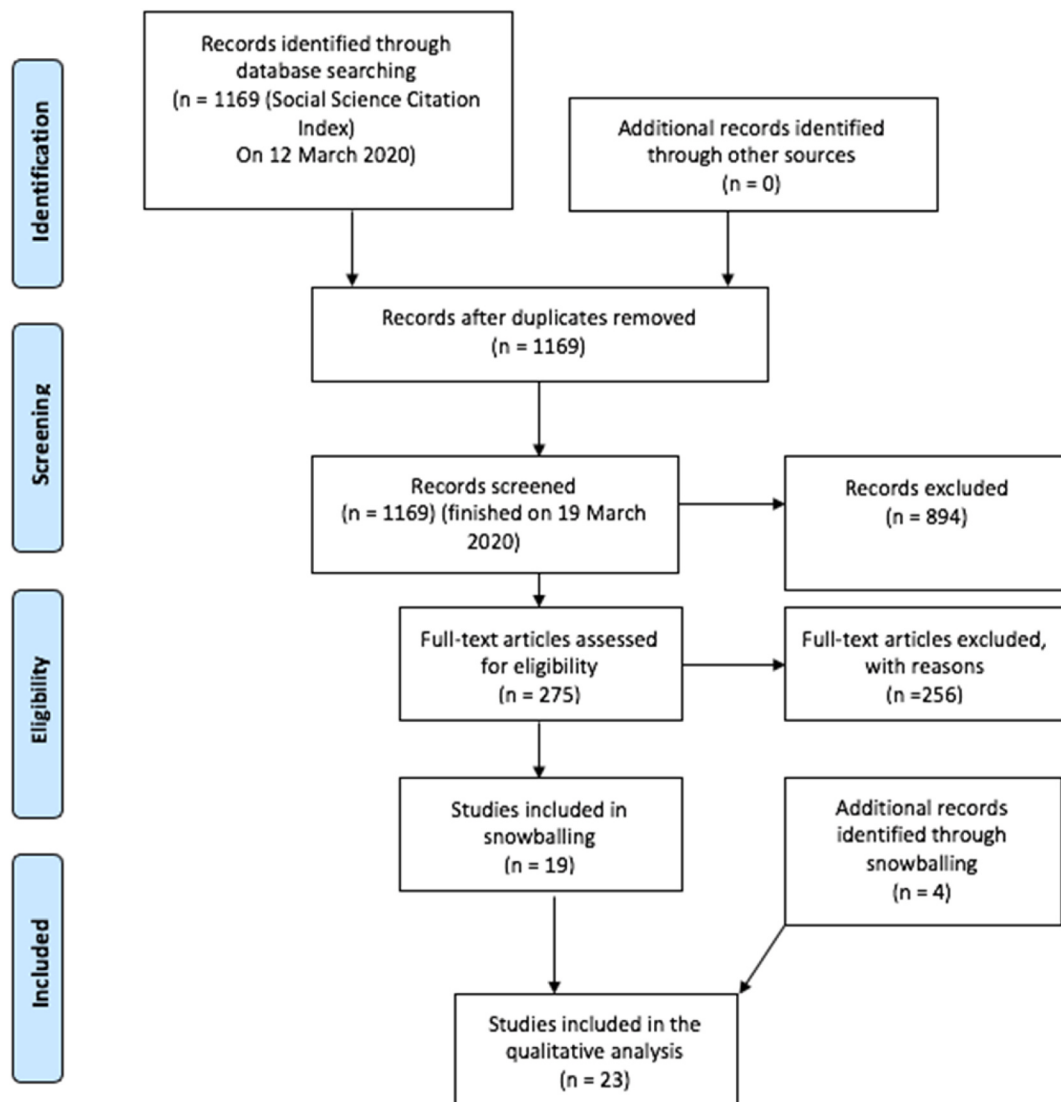


Fig. 1. Search and selection process, which includes the four phases of the search as well as an overview of the ways the criteria were applied to the studies (adapted from [Moher et al., 2015](#)).

2.3. The current study

The current study will focus on language scaffolding in secondary school subject classes to address the combination of the increasing numbers of learners who follow (some) of their secondary education in a second language, the importance of scaffolding as a concept in bilingual education, the diffuse ways in which scaffolding is defined in the handbooks and the studies that show that a focus on language is not always an integral part of subject teachers' practice. It thus synthesizes the work that has been done on conceptualizing scaffolding with the importance of language scaffolding in bilingual secondary education. The current study attempts to fill the gap identified by Lo and Lin (ibid.) by providing the field with a shared language to communicate about the nature and merits of the different ways in which scaffolding is used.

This qualitative critical thematic review uses Van de Pol et al.'s (2010) distinction between goals and means of scaffolding, as well as their descriptions of contingency, fading and transfer of responsibility, to offer a structured review of the various forms that scaffolding of language takes in bilingual education. We will synthesize research into the application of language scaffolds in secondary education content classrooms where the medium of instruction is not the learners' L1. We seek to answer the following main question: *Which forms does scaffolding of language take in contexts in which learners are learning subject content through a second language?*

This main question is split into the following three research questions (RQs) that direct our study:

- RQ1. How do researchers interpret and describe the concept of scaffolding?
- RQ2. Which means do teachers use to scaffold learning?
- RQ3. What is the relationship between scaffolding means and the goals of scaffolding?

3. Methods

3.1. Search

A literature search was conducted in Web of Science in March 2020. Web of Science was chosen since its well-established peer review system provides a standard for the rigor of the studies that are included. Articles were sought which were peer-reviewed and published after 1989, the year that Snow et al. (1989) published their landmark paper on content-based language teaching.

The search terms 'language', 'scaffolding', 'content classrooms' and 'L2 classrooms' were combined using the Boolean operator "AND" to identify potentially relevant studies in title, abstract, author keywords and Keywords Plus. The aim was to incorporate articles reporting on language scaffolding practices in L2 secondary education content classrooms, while striking a balance between very broad terms that would find all the articles related to the topic and very narrow terms that would only identify articles that exactly matched with the specific words of the research question. To enhance transparency and trustworthiness, the authors kept records of the search procedure, including the search string, the language of the search terms, the number of hits and the date of the search.

The search and selection were carried out in five stages. Fig. 1 provides an overview of the various phases in the search and selection process.

3.2. Selection

Articles were screened to determine if they were

- a) listed in the Web of Science;
- b) written in English;
- c) published in peer-reviewed journals from 1990 up to and including 2019.

After the screening, the eligibility of 275 studies was assessed to establish whether they

- d) concerned empirical research;
- e) concerned secondary content teachers teaching in L2 contexts;
- f) provided a description of or a reference to literature describing scaffolding in the introductory, theoretical or methodological sections of the article.

The selection criteria were applied one by one to each article. The first search in Web of Science on 12 March 2020 rendered 1169 articles. These results did not include any duplicates. After the search in Web of Science, only articles written in English and published between 1990 and up to and including 2019 were evaluated for their eligibility. After applying these criteria, which correspond to criteria a-c of the screening phase, 894 studies were excluded. The remaining 275 articles were subjected to criteria d-f. In order to be included in this review, the study had to include observed or self-reported behavior of teachers. These teachers had to teach a content subject, such as history, STEM, or physical education in a secondary school context. These contexts also had to be identified explicitly as an L2 environment, which means that the authors had to make a distinction between the language(s) of instruction at school and the language(s) the learners use outside of school. Finally, the study needed to use the word 'scaffolding' explicitly and include either a description of this concept, or a reference to another author who in turn describes the concept in the literature that is referenced. The 19 articles that remained after this phase were analyzed to find further articles that did meet inclusion criteria a-f, which rendered four

more studies. These studies were also analyzed to identify additional studies in the references, but no new studies that met inclusion criteria 1-f were found.

The initial search explicitly included only published articles. Nevertheless, the dissertation by Paulsrud (2014) appeared in the search results because a summary containing selected findings of the dissertation was published as a peer reviewed article (Paulsrud, 2016). The researchers chose to include the dissertation in this review because the topic of the dissertation matched exactly with the research questions of this current research and because the peer reviewed article referred to the dissertation for the full results.

The first, second and third author together established criteria for papers to be included in the review. The search and selection processes were carried out primarily by the first author, the second author providing quality-control. In the screening phase, the first author had serious doubts about whether to include a subset of six authors as they met some criteria but criterion e. The second author judged this subset on whether they should be included in the full review.

This led to the exclusion of all six articles. Four articles were excluded because they did not focus on teacher practice (e), but on student behavior, teachers' language production or CLIL leadership. Another article was excluded because it focused on university, primary and secondary teachers, which made it difficult to retrace specific findings back to the secondary education teachers (e). The final article was excluded because scaffolding or a related term was not mentioned in the results, which meant the results did not deal with language scaffolding practices (e).

Finally, the 19 studies that met criteria a-f were included in snowballing, which consisted of checking all references in their bibliographies to studies about scaffolding in bilingual contexts. Additional yet apparently relevant studies discovered in this way were checked against the eligibility criteria (steps b-f, above) and were included in the review where appropriate. This led to the inclusion of four further studies, bringing the total number of articles up to 23. A detailed account of the studies included in this review can be found in appendix A.

3.3. Data analysis

Thematic analyses were carried out to inductively identify different characteristics or types of scaffolding descriptions, goals and means in answer to the three research questions. The findings were converted into qualitative narrative form by reading the studies and formulating descriptions to capture the ways language scaffolding is described and employed in the studies. The iterative nature of the process led to regular critical evaluations of the characteristics identified by the authors.

RQ1 concerned the descriptions of scaffolding used in the articles. If authors did not describe scaffolding directly, but referred to the work of another author instead, the description in the reference was included in the analysis.

Eventually, six characteristics were identified in the descriptions of scaffolding: 1) contingency, 2) fading, 3) increased responsibility/autonomy, 4) diagnostic strategies, 5) next level, and 6) additional teacher support. The first four of these are based on characteristics identified by Van de Pol et al. (2010).

A teacher's action was deemed to be a means of scaffolding (RQ2) if an author referred to it as 'scaffolding' or if an account of the action aligned with the description of scaffolding provided in the article. Six types of scaffolding means were identified: 1) facilitate comprehensible target language (TL) input; 2) opportunities for TL output; 3) shape learners' contributions in TL; 4) teacher use of L1; 5) increase language awareness; 6) learner use of L1. The means are not intended as mutually exclusive categories, as authors often described multiple means in their research.

Although Van de Pol et al. (2010) initially describe the reasons to use scaffolding as 'goals or intentions', the majority of the article refers only to 'intentions' when discussing these reasons. The current study uses the term 'goals' instead because it investigates the reasons that researchers attribute to teachers' scaffolding behavior. In some cases, explicit statements from teachers regarding their

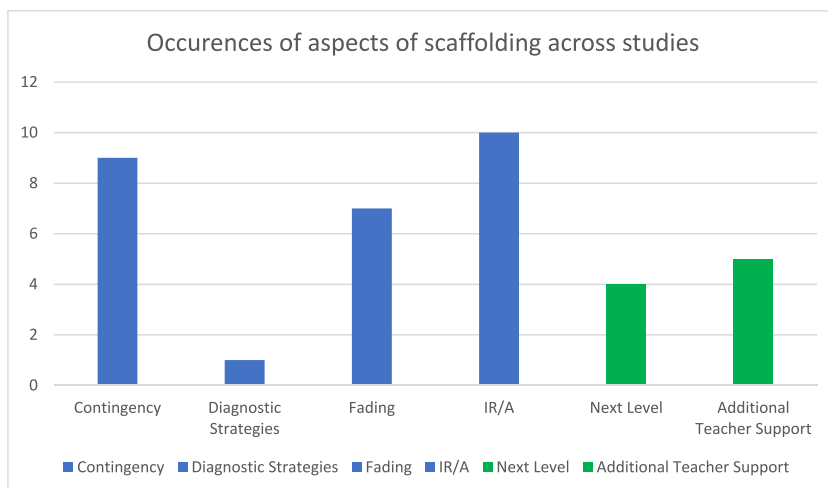


Fig. 2. Occurences of aspects of scaffolding across studies. IR/A denotes 'increased responsibility/autonomy'.

intentions were not included in the article, these reasons being inferred instead from the description of scaffolding or the reference that included the description.

During analysis, four goals of scaffolding were identified: the development of disciplinary literacy; of both content and language simultaneously; of only language; and of only meaning/content. It struck us that the overall goals of scaffolding as described by researchers were not always consistent with the goals as identified by the same researchers when describing specific scaffolding means. This led us to address the relationship between the goals of scaffolding and the means of scaffolding (RQ3). These relationships were explored on the basis of statements that revealed the teachers' goals as seen by the researchers in employing scaffolding more generally and in relation to a specific means of scaffolding.

4. Findings

The findings for each research question will be addressed in turn.

4.1. Descriptions of scaffolding (RQ1)

We will start with an investigation of the 'what' of scaffolding. [Appendix B](#) provides a summary of the distribution of the six characteristics of scaffolding across the 23 studies, and points towards a great level of variation in the ways the characteristics are included in descriptions. These findings are summarized in [Fig. 2](#).

The graph shows how many studies make use of each aspect. For example, 'contingency' appears in the descriptions of scaffolding in 9 of the studies. Studies can refer to more than one of the first four aspects, therefore the total number of occurrences in the graph does not add up to 23, which is the total number of studies included in the review, but to 38. The graph also indicates that how many studies make use of the first four aspects, and how many studies make use of the last two descriptions. These last two descriptions are less specific than the first four aspects.

Contingency corresponds to the same characteristic in [Van de Pol et al.'s \(2010\)](#) review. It is used in the description of scaffolding in nine studies. The term 'contingency' was chosen by the authors of this review to encompass the different types of aspects that fit with this category that was identified by [Van de Pol et al. \(2010\)](#). Van de Pol et al. (ibid.) used this category to describe the type of teacher support that is adapted to the current level of the student's performance. [Athanasios and de Oliveira \(2014\)](#) is the only study to use the word 'contingency' and it is also the only of the studies included in the review to reference van de Pol et al. (ibid.). The other eight studies use or refer to language such as 'specific assistance at the point of need' ([Paulsrud, 2014](#), who references Brunauer, 1983); 'respond to learners' needs' ([Lialikhova, 2019](#), who refers to [Banegas, 2012](#), p. 113, where this quote can be found); and 'appropriate kind of support' ([Wu & Lin, 2019](#), who reference [Lin, 2016](#)). Finally, [Llinares and Peña \(2015\)](#) refer to [McCormick and Donato \(2000\)](#). [McCormick and Donato \(2000\)](#) uses similar language, namely to 'assess their level of competence, and determine what type of assistance they need to accomplish a particular part of the task' (p. 185–6). 'Contingency' was chosen as a term to sum up these types of responsive supports.

It is important to note that although these different descriptions can be brought together under the term 'contingency', the sources of these descriptions are varied and no dominant reference can be established. As stated before, only Athanasios and de Oliveira refer to [Van de Pol et al. \(2010\)](#).

Only the study by [Athanasios and de Oliveira \(2014\)](#) uses both contingency and diagnostic strategies in its description. This is also the only study that references [Van de Pol et al. \(2010\)](#) or to use all four of the characteristics named in that review in their description. Two studies use contingency in combination with fading and increased responsibility/autonomy, and four other studies use contingency as the only characteristic to describe scaffolding. Finally, two studies use contingency in combination with increased responsibility/autonomy.

Diagnostic strategies, classified by Van de Pol et al. as a strategy for contingency, is taken here as a separate characteristic, following the distinction drawn in one of the reviewed articles ([Athanasios & de Oliveira, 2014](#), p. 266). This is also the only study to include this characteristic in the description of scaffolding.

Fading is also taken directly from the Van de Pol et al. review. Seven studies used it to describe scaffolding and in all seven cases it is used in combination with *increased responsibility/autonomy*. [Zwiers \(2006\)](#) refers to [Wood et al. \(1976\)](#) when stating that 'scaffolding refers to providing extensive educational support early on and then gradually taking it away as a learner builds independence in a skill or area of knowledge' ([Zwiers, 2006](#), p. 321). This description by Zwiers is adopted directly by [Schall-Leckrone \(2017\)](#). Three of the studies use fading in combination with contingency. [Paulsrud \(2014\)](#) combines these ideas by stating that scaffolding 'is offered at the point of need but also only as long as needed' ([Paulsrud, 2014](#), p. 32).

Increased responsibility/autonomy is an adaptation of Van de Pol et al.'s 'transfer of responsibility', with clearer acknowledgement of the fostering of learner independence ([Athanasios & de Oliveira, 2014](#), p. 289). *Increased responsibility/autonomy* is included in the descriptions in ten studies. In seven instances it is combined with fading. Two other articles combine it with contingency. [Probyn \(2015\)](#) uses Gibbons' concept of 'bridge building', which corresponds with the characteristic of contingency. [Phuntsog \(2018\)](#) refers to Probyn's description when describing scaffolding and thus also indirectly refers back to [Gibbons \(2006\)](#).

The final two characteristics of scaffolding (next level and additional teacher support) were constructed for articles that did not include any of the previous four characteristics. The descriptions in these articles were less specific than in the others.

Next level 'refers to the process that enables a learner to accomplish a task which would otherwise be beyond his/her efforts' ([Lo, Lui, & Wong, 2019](#), p. 293) but does not refer to the learner's role in this, as in the increased responsibility or autonomy as described by [Van de Pol et al. \(2010\)](#). A description in line with this definition was found in four of the reviewed articles.

If the description referred to support strategies but not explicitly to a *next level*, it was classified more broadly as *additional teacher support* that helps them to construct meaning and/or facilitates language development. There are five studies which describe scaffolding in this way, namely as a teacher made linguistic learning framework (Axelsson & Slotte, 2017), ‘embedded support’ (Clark, Touchman, Martinez-Garza, Ramirez-Marin, & Drews, 2012), ‘support’ (Early & Norton, 2014) or a ‘form of facilitation’ (Tavares, 2015) that helps the learner to develop.

4.2. Scaffolding means (RQ2)

The review will now turn to the ‘how’ of scaffolding, or the different ways scaffolding is implemented by teachers. Appendix C displays the different means of scaffolding that are reported in the studies. These findings are also summarized in Figs. 3 and 4.

Fig. 3 shows how many studies make use of each overall goal of scaffolding. The dark blue bar represents the number of studies that make use of each overall scaffolding goal. For example, 13 studies identify ‘content and language’ as the overall goal of scaffolding.

Fig. 4 illustrates how the scaffolding goals per means are distributed over the overall descriptions of scaffolding. The blue, orange, yellow and green bars represent the number of times a goal is mentioned as a goal for a specific scaffolding means. So, for the same example as with Fig. 3, within the 13 studies that identify ‘content and language’ as the main goal of scaffolding, 16 of the means of scaffolding have ‘meaning/content’ as its goal. 2 of the means identify language as a goal, 28 list content and language as a goal and 2 name disciplinary literacy as a goal of the means.

Facilitate comprehensible TL input involves a conscious effort to make the lesson accessible through a variety of extra-linguistic means such as visuals and graphic organizers, speaking clearly, and using gestures (Echevarria et al., 2016; Schall-Leckrone & Pavlak, 2014). This includes linking content to students’ cultural resources (Athanasos & de Oliveira, 2014), deliberate code-switching by the teacher to elaborate on an explanation and brief language or content explanations (Fennema-Bloom, 2010), but also short assignments such as ‘concept-vocabulary matching games which guided students to tackle difficulties in learning conceptual terms and their spellings’ (He & Lin, 2018, p. 177). Almost all articles (22) include this category. The exception is Llinares and Peña (2015), which focused mostly on output and the various ways in which output can be scaffolded.

Opportunities for TL output includes scaffolding in which the teacher provided space for students to contribute to classroom interaction and writing in the TL. Seventeen of the studies include ways in which students could contribute to classroom interaction. Examples include the creation of interactional space where students could confer with each other (cf. Axelsson & Slotte, 2017; Lialikhova, 2019), opportunities for students to individually present, write down answers or construct essays (cf. Forey & Cheung, 2019; Gil, Garau, & Noguera, 2012) or create new representations of knowledge where they would, for instance, turn a graph into a story or vice versa (Grandinetti, Langellotti, & Ting, 2013).

Scaffolding that *shapes TL contributions* is described as an interaction where ‘through shaping the discourse the teacher scaffolds students in articulating what they mean’ (Urmeneta & Evnitskaya, 2014, p. 166). Sixteen studies include instances of teachers helping learners to articulate their thoughts in the TL. Fifteen of the studies that include *opportunities for TL output* also include ways for teachers to shape learners’ contributions. Early and Norton (2014) is the only study that does not include an opportunity for learners to contribute in the TL, but does refer to the shaping of learners’ contributions. This is because it was not possible to determine from the article whether the opportunity that was provided for learners to contribute presupposed that they would do so in the TL. A further two studies include ways for teachers to provide opportunities for TL output but do not identify scaffolds for shaping these contributions (Axelsson & Slotte, 2017; Gil et al., 2012).

The scaffolds to shape learners’ contributions included approaches to extending student talk (e.g. Athanasos & de Oliveira, 2014; Lialikhova, 2019; Urmeneta & Evnitskaya, 2014), writing instructions (Walldén, 2019; Zwiers, 2006), participation structures

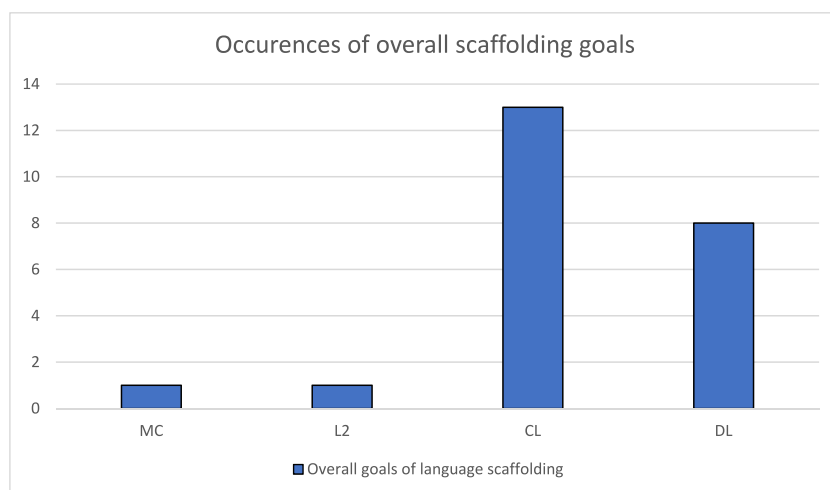


Fig. 3. Occurences of overall scaffolding goals and the goals per means.

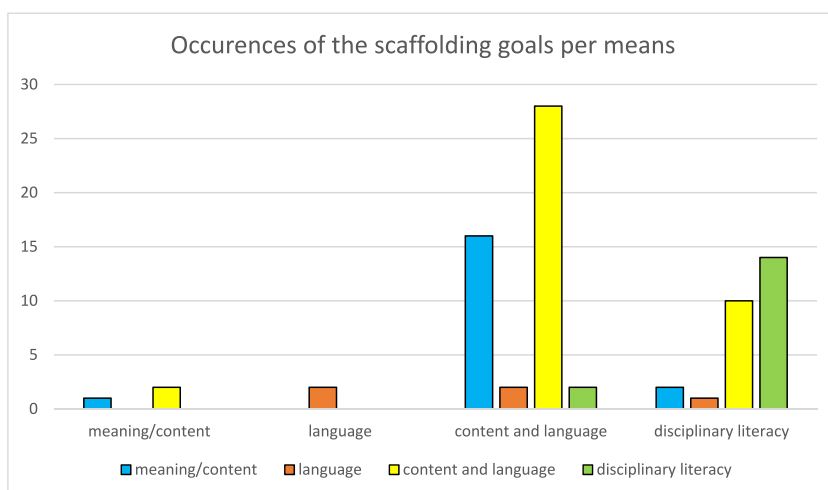


Fig. 4. Occurrences scaffolding goals per means.

(Lialikhova, 2019; Schall-Leckrone, 2017; Tavares, 2015), worked examples and modelling (Early & Norton, 2014; Forey & Cheung, 2019; Lo et al., 2019), and instructions for active practice (Grandinetti et al., 2013; Townsend, 2015).

Scaffolding which has been labelled *teacher use of L1* is the teacher ‘using L1 as a rich resource [...] to facilitate learners’ comprehension and interaction in the TL’ (Tavares, 2015, p. 321). Ten studies identify instances of teacher L1 use. These instances include parallel texts, where students are provided with texts in their L1 and the TL (see Clark et al., 2012; Lin, 2013), code-switching in class, where the teacher switches from one language to another during an explanation or instruction (Gil et al., 2012; Paulsrud, 2014; Phuntsog, 2018; Wu & Lin, 2019), and code-switching to facilitate student translanguaging, in which students process part of the content in L1 and are supported in the L1 to produce output in the TL (Probyn, 2015; Tavares, 2015).

Scaffolding labelled *learner use of L1* is taken to mean ‘through shaping the discourse the teacher scaffolds students in articulating what they mean by using the use of the L1 by the learners’ (adapted from Urmeneta & Evnitskaya, 2014). Eight studies report on instances in which the teacher facilitates learners in using their L1 in order to support their learning. Two of the studies (Clark et al., 2012; Lin, 2013) investigate the use of explicit bilingual approaches where learning material is provided both in the L1 and in the TL. Paulsrud (2014), Gil et al. (2012) and Urmeneta and Peña (2014) report on various practices that include providing input in the L1 and supporting students with questions in their L1 to help students to process input. Fennema-Bloom (2010) and Phuntsog (2018) observe practices in which teachers check for understanding in students’ L1 to review material or to see whether instructions can proceed. Probyn (2015) and Tavares (2015) report on teachers’ stimulating students to process input in their L1, and then facilitating the process of producing spoken or written output in the TL.

Increase language awareness has a ‘focus on linguistic item(s), with the goal of the facilitation of [...] metalinguistic awareness outside the content instruction’ (Paulsrud, 2014, p. 165). Seven studies describe teacher behavior that is identified as scaffolding in line with this definition. The behaviors included providing rhetorical structures, which relates to periodicity in texts (Walldén, 2019, p. 8), syllabification and building morphological awareness (Townsend, 2015, p. 382 and Tavares, 2015, p. 328), explaining the similarities between languages (Paulsrud, 2014, p. 165), and the use of ‘metalinguistic resources which focus on language, clause and discourse semantic features provide a scaffold for a shift in the register’ (Forey & Cheung, 2019, p. 97).

4.3. Relationship between scaffolding means and the goals of scaffolding (RQ3)

The next section will now turn to the ‘how’ of scaffolding. Here, we provide an overview of the overall goals of language scaffolding that were identified by researchers, as well as an analysis of the goals that researchers attributed to specific language scaffolding means.

Four goals of scaffolding were found: the development of only meaning/content (MC); of only language (L2); of both content and language simultaneously (CL); and of disciplinary literacy (DL). MC and L2 refer to instances where either content learning/meaning or language development is addressed independently of the other. For example, Wu and Lin (2019, p. 261) identify the goal of scaffolding as the development of ‘L2 scientific language development’, and Gil et al. (2012) describe the goal of scaffolding as being to assist learners in immersion programs in coping with subject matter. CL, on the other hand, encompasses the development of the previous two simultaneously. DL includes disciplinary targets, such as ‘learning to think like a historian, mathematician, literary critic’ (Athanasios & de Oliveira, 2014, p. 267). Authors referred both goals of scaffolding in general and they identified the goals of particular means as described in relation to RQ2. As can be seen in Fig. 4, these goals were not always aligned.

Of the 23 studies included in this paper, five studies consistently attribute the goal of language scaffolding to the means of scaffolding that are identified in the study. The other 18 studies do not consistently apply the goal of language scaffolding to the means described in the same study. In four of these 18 studies, the stated goal of scaffolding is never identified the goal of any means. The

remaining 14 studies attribute the goal to some, but not all, of the means described. For instance, Athanases and de Oliveira (2017) do attribute disciplinary literacy to *shaping TL contributions*, but they attribute the goals of content, and content and language, to *facilitate comprehensible TL input* and *opportunities for TL output* respectively. Fennema-Bloom (2010) attributes the goal of content and language to *comprehensibility of input in TL* and *teacher use of L1*, but not to *learner use of L1*, which has the goal of content development.

Wu and Lin (2019) is the only study that identifies the goal of scaffolding as L2 development. This is also one of the five studies that consistently attribute the goal of language scaffolding to the means of scaffolding that are identified in the study as they explain that L2 is the goal when the teacher engages in *facilitating comprehensible L2 input* and *teacher use of L1*. Gil et al. (2012) identifies content as the goal of scaffolding and attributes both content, and content and language as a goal of the means described in the study.

The majority of the articles, thirteen in total, characterize the goal of scaffolding as the development of both content and language. This could suggest that teachers feel that they are responsible for the development of both, as seen in the studies by Urmeneta and Evnitskaya (2014), who describe the goal of language scaffolding as to '[help] students develop linguistic and academic skills and achieve higher levels of understanding' (p. 166), and by He and Lin (2018), who see describe the goal as being to 'raise awareness of both academic content knowledge and academic language knowledge' (p. 174). Eleven of these thirteen studies attribute content and language (CL), content alone (MC) or L2 alone to the means of language scaffolding. Two studies (He & Lin, 2018; Wallden, 2019) also include disciplinary literacy as one of the goals of the means. Lialikhova (2019) is the only study that consistently attributes the goal of simultaneous content and language to all three means identified in the study. Both Grandinetti et al. (2013) and Phuntsog (2018) state that the development of content and language is the goal of scaffolding, but designate content development as the goal of the means included in their studies.

Eight of the studies include disciplinary literacy development as the goal of scaffolding. Across these studies all four goals are attributed to scaffolding means, although Zwiers is the only study to attribute L2 to a means. Athanases and de Oliveira (2014) and Forey and Cheung (2019) are the only two studies to attribute meaning/content as a goal of a means, in both cases for *comprehensible input*. Two studies (Lin, 2013; Linares and Pascual Peña, 2015) consistently apply disciplinary literacy to all the means identified. Clark et al. (2012) and Townsend (2015) consistently attribute content and language development as the goals of specific means, whereas both state that the goal of scaffolding is disciplinary literacy. Of the six studies that sometimes attribute disciplinary literacy to the means, all attribute disciplinary literacy as a goal of *shaping TL contributions*.

5. Discussion

5.1. Characteristics of scaffolding ('what?')

The review of the authors' descriptions of scaffolding (RQ1) identified six characteristics of scaffolding and points towards variation in the ways that scaffolding is described in bilingual education research (Coyle et al., 2010; Echevarria et al., 2016; Gibbons, 2015; Lo & Lin, 2019; Yu, Wang, & Teo, 2018). This reflects similar variation in the SLA context, as pointed out by Hamidi and Bagherzadeh (2018) and reinforces their conclusion that scaffolding of language in education is a process that requires more research.

Van de Pol et al.'s framework is frequently referenced in educational research literature to operationalize the concept of scaffolding (Rojas-Drummond, Torreblanca, Pedraza, Vélez, & Guzmán, 2013; Wischgoll, Pauli, & Reusser, 2019). Analysis of the descriptions of scaffolding provided by authors in the current studies, however, revealed that Van de Pol et al.'s (2010) characteristics of scaffolding feature only to a limited degree. Only one of the articles uses all four characteristics, and nine articles use none of them. Furthermore, apart from Athanases and de Oliveira (2014), none of the 21 articles published after Van de Pol et al.'s (2010) review reference Van de Pol when describing what scaffolding means in the context of their research. Moreover, in the literature from broader educational research, contingency is seen as a necessary characteristic of scaffolding (Van de Pol, Mercer, & Volman, 2019). However, the fact that not all of the studies analyzed in this study include contingency in their description of scaffolding suggests that, in bilingual education research, contingency may not hold the status as a necessary condition in order for a behavior to be considered scaffolding. One of the implications of this finding is that within these studies it might be difficult to distinguish scaffolding from other types of support.

This review also shows that it is not possible to establish a dominant reference article among the articles that do use contingency.

Taken together, these findings highlight the importance – as implied by Lo and Lin (2019) – of further exploring the concept of scaffolding specifically within the context of bilingual education. These findings also suggest that there is a need for conceptual clarity within this field around the concept of scaffolding. Without dominant references and descriptions in the field, there is a pronounced need to describe the concept in a clear and explicit manner.

5.2. Means of scaffolding ('how?')

This review identified six scaffolding means specific to bilingual education contexts (RQ2): *facilitate comprehensible TL input*, *opportunities for TL output*, *shape TL contributions*, *teacher use of L1*, *increase language awareness*, and *learner use of L1*. These means not only correspond to various phases of the learning cycle (input, processing and output), but also show the various ways in which learning specifically in bilingual environments can be supported through the use of TL, L1 and language awareness. The first three means and increase language awareness all feature in recommendations for good practice in the literature on bilingual education (Coyle et al., 2010; Echevarria et al., 2016; Gibbons, 2015; Lin, 2016). There appears to be a link between *opportunities for TL output* and *shaping these contributions*, whereby most articles that report on the former also describe the latter. The shaping of output in the TL might follow logically from the provision of opportunities for output in the TL. The shaping of output can only occur if output is produced. And this output can only be produced if an opportunity to produce output is provided. It is, however, salient to see that subject teachers

are not only providing opportunities for output, but also shape this output. This, together with the number of articles that indicate the overarching goal of scaffolding as simultaneous support of content and language shows that teachers do not only feel responsible for content but for language as well.

The position of L1 is somewhat more complicated as the ‘two solitudes’ assumption saw the separation of languages as an appropriate methodology in bilingual education for several decades. This approach propagated the use of the language of instruction to exclude the students’ L1 in order to minimize the inference of the L1 while learning the language of instruction (Cummins, 2005, 2007, p. 588). Recent empirical insights have challenged this assumption and led to various initiatives to introduce the L1 in bilingual classrooms (see Evangelou, 2016; Kerr, 2019; Van Avermaet et al., 2018). Eight of the reviewed articles identify the *use of L1 by both the teacher and the students* as a means to scaffold language. Rather than showing this in a conceptual way, the 8 studies show that the L1 is not only used by teachers as a means to scaffold, but that they are identified as such by researchers as well. This illustrates a break with the idea that the L1 should be excluded entirely from the L2 content classroom.

5.3. Goals of scaffolding (‘why?’)

With eight studies designating the goal of scaffolding as disciplinary literacy, and thirteen labelling the goal as both content and language development, most studies attribute the goal of scaffolding to supporting both content and language, rather than just one of them. Disciplinary literacy points in the direction of a way to integrate content and language objectives, and is a relatively new concept in bilingual education research (Cenoz, 2015; Llinares, 2015; Ruiz de Zarobe & Cenoz, 2015). The findings from this review suggest that disciplinary literacy development is a goal that can be attributed to all means apart from the use of L1 by students, thus not only showing that disciplinary goals are assigned by researchers to particular means, but also the different ways in which disciplinary literacy can be developed by teachers through these means.

Examination of the relationships between the means of scaffolding employed by teachers and the underlying goals identified by researchers revealed that the goal behind a means of scaffolding may not always be the same as the goal behind scaffolding in general. When the overarching goal and the goals of the means of scaffolding are not the same, there appears to be a relationship between these goals. This review points in the direction of a hierarchy of scaffolding goals, in which the basis is formed by a focus on language *or* content, a focus on language *and* content naturally includes both the former and the latter, and where disciplinary literacy incorporates both language and content but adds subject specific skills and/or competences, as illustrated in Fig. 5.

Content or language as an overarching goal of language scaffolding means that the goals of the means of scaffolding are also geared towards either language or content. Content and language as an overarching goal of language scaffolding means that the goals of the means of scaffolding are also geared towards either language or content or language and content. Disciplinary literacy as an overarching goal of language scaffolding means that the goals of the means of scaffolding are also geared towards either language or content or language and content, or disciplinary literacy.

With a nod to Lemke (1991), Girard and McArthur Harris (2012) describe the problem of disciplinary literacy as ‘understanding parts without knowing the whole’. Sometimes, concepts, relationships and ways of communicating that are specific to the subject only make sense if you understand the whole subject (Lemke, 1991). The problem for students is that they are introduced to a subject, and this usually entails learning the subject bit by bit, which means they do not know the whole but still have to make sense of the concepts

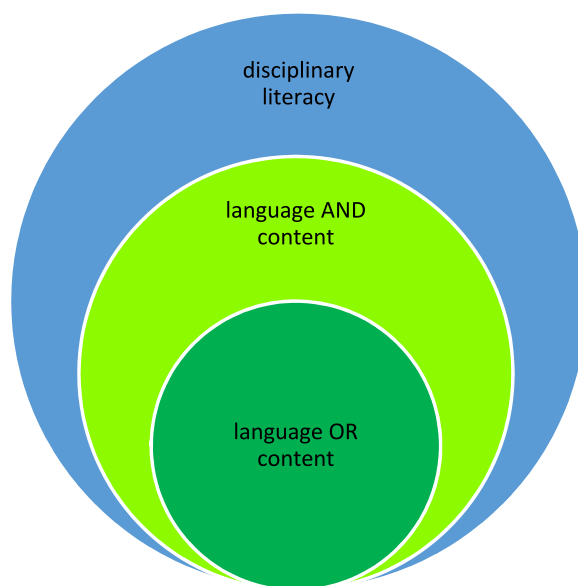


Fig. 5. Relationship between scaffolding goals. The figure shows that disciplinary literacy presupposes a focus on language and content but adds something to these foci, namely subject specific ways of approaching texts.

and relationships. Furthermore, successful approaches to disciplinary literacy in the classroom are not that well documented (Fenwick & Herrington, 2022). Fig. 5 can provide a way to analyze this problem and to develop a repertoire to enact disciplinary literacy. Shanahan and Shanahan (2008) believe that teaching students how to think within a certain subject presumes that they are taught the content and language to engage in discipline-specific approaches (Shanahan & Shanahan, 2008, p. 51). Understanding that a disciplinary literacies approach to subject teaching does presume a focus on content knowledge and language can help to better understand, analyze and convey the ways in which disciplinary literacies as an approach can be practiced. This resonates with Galguera's (2011) and Bunch's (2013) notion of pedagogical language knowledge. Pedagogical language knowledge hinges on the idea that teachers' understanding of language and content should be built up in order to allow these teachers to engage learners in meaningful and challenging literacy (Bunch, 2013).

Across the eight articles that assign disciplinary literacy as goal to scaffolding, language and content have an intricate relationship, though it is one that is not always explicated or the same. Disciplinary literacy as a term in Athanases and de Oliveira (2014), refers to reading routines and language use specialized to the subject (Shanahan & Shanahan, 2008). In this description, the role of content and language remains largely implicit, which is also the case for Clark et al.'s (2012) scientific literacy in reference to Fang, Lamme, and Pringle (2010). In Forey and Cheung, disciplinary literacy is a 'pedagogic approach that connects discipline specific language and knowledge' (2019, p. 92) and in Townsend, 'linguistic features are used purposefully in disciplines, usually to convey meaning' (2015, p. 277). Two articles refer to supporting development of disciplinary literacy through genre pedagogy (Llinares and Pascual Peña, 2015; Schall-Leckrone, 2017), whereby content obtains its specific meaning through recurrent organizational and linguistic features (Martin & Rose, 2008). Finally, Lin (2013) and Zwiers (2006) do not refer to other literature when they refer to their 'bilingual academic literacies' and 'historical thinking' respectively. Disciplinary literacy encompasses a focus on content and language development, because in order to engage in that type of literacy there needs to be a focus on both content and language learning.

5.4. Limitations

This review uses 'scaffold' as one of its main search terms. As illustrated here, descriptions of scaffolding are quite diffuse. Even though synonyms of the term were included in the search and a snowball was conducted, it is therefore possible that other relevant studies were overlooked.

Web of Science was chosen for the search because of its well-established peer review system, which provides a standard for the rigor of the studies that are included. After the search, snowballing was applied to find four more articles, which increased the reach of the search. There is a small possibility that more relevant studies of good quality not included in Web of Science or the snowball are spread over other data bases, but opening up these possibilities would have meant that the quality of these studies would then also have to be checked.

This review has also not examined the ways in which scaffolding in different environments, such as SIOP or CLIL, employ the concept of scaffolding. One of the reasons for this is that researchers do not always consistently use the same terms to describe these contexts or describe them in enough detail to infer their type.

The number of studies included in the study and the ways school subjects were distributed over the studies does not make it possible to draw conclusions about the ways in which language scaffolding plays out in different subjects. Studies are spread over a variety of school subjects and some included several subjects.

5.5. Directions for future research

This study highlights a need for more research in order to establish a shared language to communicate effectively about scaffolding in bilingual contexts. In particular, further inquiries are needed with regard to the role of contingency as a necessary condition of language scaffolding in bilingual education.

Furthermore, this conceptual study could be complemented by research into the classroom practice of teachers in bilingual education. Such research could provide more insight into the ways in which different bilingual contexts render different configurations of scaffolding and into the relationship between goals as enacted in practice. Investigating the degree to which the characteristics, means and goals identified in this review correspond to the lived reality of teachers in bilingual education classrooms could help to produce a more refined model of scaffolding in bilingual education that is embedded in both theory and practice. This kind of investigation could also shed further light on the relationship between means and goals, since in the current review it was the researchers, and in turn the reviewers who identified goals and related them to the means, rather than the teachers themselves.

Finally, future research into the practices within specific school subjects might also show how language scaffolding is enacted across different subjects. Language scaffolding has been shown to be relevant in supporting disciplinary literacy (Fenwick & Herrington, 2022) and therefore investigating how language scaffolding plays out within subject specific disciplines would add to further understanding of effective teaching for disciplinary literacies.

6. Conclusions

This review set out to clarify the types of language scaffolding that are used by researchers to analyze scaffolding in secondary bilingual education contexts, the ways scaffolding can be employed by teachers in these contexts and the reasons teachers have to scaffold learning in these ways. The paper explored the 'what, how and why' of language scaffolding through exploring the forms that language scaffolding takes in 23 empirical peer-reviewed articles reporting on language scaffolding practices in L2 secondary

education content classrooms. For the interpretations and descriptions of scaffolding (RQ1), the following six characteristics of scaffolding were identified: contingency, diagnostic strategies, fading, increased responsibility/autonomy, helping students to reach the next level in their development, and additional teacher support. The descriptions showed a high level of variation, which points to a diffuse use of the concept of scaffolding in bilingual education research as well as a need for conceptual clarity.

Although ‘contingency’ has the status of necessary condition in recent literature on scaffolding in broader educational contexts, this does not appear to be the case for bilingual education research literature.

For the ways in which language scaffolding can be used in class (RQ2), we found six means of scaffolding, as well as a possible link between providing opportunities for TL output and shaping TL contributions. Furthermore, we found evidence for a relationship between teacher use of L1 and learner use of L1, which suggests that in bilingual education the use of L1 by teachers could correspond to the ways stimulate the use of L1 by learners as a way to scaffold learning.

The analysis of the relationship between scaffolding goals and goals assigned to specific means (RQ3) indicates that the goals of means do not always align with the goals that a study assigns to scaffolding in general. Our investigation shows that scaffolding goals assigned to means are in most cases either similar to or enveloped in the goal attributed to scaffolding. There is also a pattern in the way that scaffolding goals relate to each other, suggesting that there is a hierarchy of language scaffolding goals in which disciplinary literacy presupposes a focus on content and language. The combination of variation and patterns makes future research into language scaffolding practices so urgent. It will be exciting to see where further research in this area will lead in terms of our understanding of the complex content-language relationship at the heart of bilingual classrooms.

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Author statement

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Declaration of competing interest

No potential conflict of interest was reported by the authors.

Data availability

Data will be made available on request.

Appendix A

Reference (author (s), year)	Subjects (content) (Listed if number of subjects studied is < 4)	Country setting	Target language	Type of education as identified in the article	L1 context of the learners as identified in the article	Data sources
Athanasios and de Oliveira (2014)	English, History and Mathematics	United States of America	English	Public charter school	English, Spanish	Field notes, lesson observations, interviews, questionnaires, lesson materials and student work
Axelsson and Slotte (2017)	Religion	Finland	Swedish	Swedish-medium schools	Finnish/Swedish	Lesson observations
Clark et al. (2012)	Science	United States of America	English	Public secondary education	Second language learners. Approximately 75% of the students speak Spanish at home	Pre-test, post-test, delayed post-test and student work
Early and Norton (2014)	Various	Uganda	English	EMI	Lumasaba, Lugisu	Questionnaire and interviews
Fennema-Bloom (2010)	Science	United States of America	English	Transitional Bilingual Education	Mandarin	Lesson observations, interviews, questionnaires, interviews
Forey and Cheung (2019)	Physical education	The United Kingdom	English	English secondary education	Students who use English as an additional language	Interviews, lesson observations and student work
Gil et al. (2012)	English and Technology	Spain	English	CLIL and EFL	Spanish, Catalan	Questionnaires, interviews and lesson observations

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Reference (author (s), year)	Subjects (content) (Listed if number of subjects studied is < 4)	Country setting	Target language	Type of education as identified in the article	L1 context of the learners as identified in the article	Data sources
Grandinetti et al. (2013)	Science and English	Italy	English	CLIL	Italian	Lesson materials, lesson observations and interviews
He and Lin (2018)	Science	Hong Kong (People's Republic of China)	English	EMI	South Asian Languages	Lesson observations, interviews, field notes, interviews, lesson materials
Lialikhova (2019)	History	Norway	English	Norwegian Public School Education	Norwegian	Lesson observations
Lin, 2013b	Science and Chemistry	Hong Kong (People's Republic of China)	English	EMI	Cantonese	Lesson materials, lesson observations and interviews
Llinares and Pascual Peña, 2015	History	Spain	English	CLIL	Spanish	Lesson observations
Lo et al. (2019)	Science	Hong Kong (People's Republic of China)	English	CLIL	Cantonese	Lesson observations, lesson materials, student work and interviews
Paulsrud (2014)	Various	Sweden	English	CLIL	Swedish	Interviews, lesson observations and student work
Phuntsog (2018)	Science	India	English	Tibetan Children's Village Schools	Tibetan	Questionnaire and classroom observations
Probyn (2015)	Science	South Africa	English	Township and rural schools with English as language of learning and teaching	isiXhosa	Lesson observations and interviews
Schall-Leckrone (2017)	History	United States of America	English	Sheltered Instruction	Linguistically diverse student populations	Lesson observations, Field notes, lesson materials and interviews
Tavares (2015)	Mathematics	Hong Kong (People's Republic of China)	English	EMI	Cantonese	Interviews and classroom observations
Townsend (2015)	Various	United States of America	English	Secondary Education	Spanish	Interviews, Lesson observations and questionnaires
Urmeneta & Evnitskaya, 2014	Biology	Spain	English	CLIL	Catalan, Spanish	Lesson observations
Wallden, 2019	Cross curricular: geography and Swedish as a second language	Sweden	Swedish	Swedish public secondary education	Students with migrant backgrounds	Lesson observations and field notes
Wu and Lin (2019)	Biology	Hong Kong (People's Republic of China)	English	A government subsidized school	Cantonese	Lesson observation, interviews and lesson materials
Zwiers (2006)	History	United States of America	English	A middle school	Spanish, Amharic, Vietnamese, Korean, Mandarin	Action research

Appendix B

	Contingency	Diagnostic strategies	Fading	Increased responsibility/ autonomy	<i>If none of the previous four</i>	
					Next level	Additional teacher support
Athanases and de Oliveira (2014)	X	X	X	X		
Axelsson and Slotte (2017)						X
Clark et al. (2012)						X

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(continued)

	Contingency	Diagnostic strategies	Fading	Increased responsibility/ autonomy	If none of the previous four	
					Next level	Additional teacher support
Early and Norton (2014)						X
Fennema-Bloom (2010)					X	
Forey and Cheung (2019)			X	X		
Gil et al. (2012)					X	
Grandinetti et al. (2013)						X
He and Lin (2018)	X					
Lialikhova (2019)	X		X	X		
Lin (2013)	X					
Llinares and Pascual Peña (2015)	X					
Lo and Lin (2019)					X	
Paulsrud (2014)	X		X	X		
Phuntsog, 2018	X			X		
Probyn (2015)	X			X		
Schall-Leckrone (2017)			X	X		
Tavares (2015)						X
Townsend (2015)			X	X		
Urmeneta & Evnitskaya (2014)					X	
Walldén (2019)				X		
Wu and Lin (2019)	X					
Zwiers (2006)			X	X		
	9	1	7	10	4	5

Appendix B: Characteristics of scaffolding according to authors' descriptions. The table includes the studies that are included in this review on the first column. The aspects that can potentially be included in the description of scaffolding are listed in the first row. The first four aspects correspond with aspects that are also identified by Van de Pol et al. (2010). The last two aspects, 'next level' and 'additional teacher support' show how language scaffolding is described if none of the four previous aspects are included in the description. It is therefore possible to have a combination of one or more of the first four aspects, but not of the first four and the last two aspects.

Appendix C

	Goal of scaffolding	Goal of means					
		Facilitate comprehensible TL input	Opportunities for TL output	Shape TL contributions	Teacher L1*	Learner L1	Increase language awareness
Athanases and de Oliveira (2014)	DL	MC	CL	DL	–	–	–
Axelsson and Slotte (2017)	CL	MC	CL	–	–	–	–
Clark et al. (2012)	DL	CL	–	–	(CL)	CL	–
Early and Norton (2014)	CL	CL	–	–	–	–	–
Fennema-Bloom (2010)	CL	CL	–	–	(CL)	MC	–
Forey and Cheung (2019)	DL	MC	CL	DL		–	DL
Gil et al. (2012)	MC	CL	–	–	(CL)	MC	–
Grandinetti et al. (2013)	CL	MC	MC	MC	–	–	–
He and Lin (2018)	CL	CL	CL	CL	–	–	DL
Lialikhova (2019)	CL	CL	CL	CL	–	–	–
Lin (2013)	DL	DL	DL	DL	(DL)	–	–
Llinares and Pascual Peña (2015)	DL	–	DL	DL	–	–	–
Lo et al. (2019)	CL	CL	MC	L2	–	–	–
Paulsrud (2014)	CL	MC	–	–	(MC)	CL	CL
Phuntsog (2018)	CL	MC	–	–	(MC)	MC	–
Probyn (2015)	CL	CL	CL	CL	(CL)	MC	–
Schall-Leckrone (2017)	DL	CL	DL	DL	–	–	–
Tavares (2015)	CL	MC	CL	CL	CL	CL	L2
Townsend (2015)	DL	CL	CL	CL	–	–	–
Urmeneta & Evnitskaya (2014)	CL	CL	CL	CL	CL	MC	–
Walldén (2019)	CL	MC	CL	DL	–	–	MC

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	Goal of scaffolding	Goal of means					
		Facilitate comprehensible TL input	Opportunities for TL output	Shape TL contributions	Teacher L1*	Learner L1	Increase language awareness
Wu and Lin (2019)	L2	L2	–	–	(L2)	–	–
Zwiers (2006)	DL	DL	L2	DL	–	–	–

Appendix C: Relationship between the goals of scaffolding and scaffolding means analyzed above.

The first column lists the included studies in alphabetical order.

The second column lists the overall goal of language scaffolding as identified by or inferred from the article. For instance, language scaffolding in Athanases and de Oliveira (2014) has disciplinary literacy (DL as its main goal). The acronyms correspond to the scaffolding goals in the following way: MC = only meaning/content; L2 = only language; CL = both content and language simultaneously; and DL = disciplinary literacy.

The first row lists the overall goal of scaffolding as well as the specific means of scaffolding. These specific means are the ways that language scaffolding is enacted. For instance, all but one study, Linares and Peña (2015), mentioned facilitating comprehensible input as a way to engage in language scaffolding.

For most of the means of scaffolding it was also possible to determine the specific scaffolding goal.

Note. Brackets signify studies where 'Teacher L1 is' the only instance of 'facilitate comprehensible TL input' mentioned in the study.

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