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Peer Tutoring and Scaffolding Principle for Inclusive Teaching[1]

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Abstract

This paper aims to investigate the theoretical references that the literature offers with respect to the principle of scaffolding and to the methodology of Peer Tutoring from an inclusive perspective. The principle of scaffolding, in fact, has its roots in the first definitions by Vygotskij (1978a) who defines it as the social support provided to the student during the completion of a learning task to solve a problem or achieve a goal. Subsequently, this principle has been declined in an inclusive perspective with respect to classroom management and with respect to new transmedia learning environments. The reference literature was reviewed to highlight the learning outcomes related to the principle of cognitive, metacognitive and emotional scaffolding. In addition, from the point of view of classroom management from an inclusive perspective, a declination that is effective refers to Peer Tutoring. This methodology aims to promote mutual interactions mediated by peers in order to optimize individual functioning and promote the holistic development of the parties involved. Therefore, the Peer Tutoring methodology was highlighted with reference to both the theoretical and practical components of the studies investigated.

Keywords: metacognitive scaffolding; peer tutoring; peer tutoring higher education; scaffolding.

[1] For the purposes of academic recognition, contributions are attributed as follows: paragraph 1, 2 and 3 to Guendalina Peconio; paragraph 4 and 5 to Giuliana Nardacchione; and the introduction and the conclusion is the result of a shared work.

Introduction

Scaffolding supports the learning of individuals and, specifically, students in the early stages; reducing effort and providing opportunities for responsibility, in individuals, in performing a task automatically (Slavin, 2019). This principle is, therefore, useful, to improve cognitive effects in learning; another key aspect refers to the ability of self-regulation that affects this improvement (Shirmohammadi & Salehi, 2017).

Shelfolding can be promoted through direct mediation in the dialogue between student and teacher; in order to promote this approach however, it is necessary for teachers to design learning activities and use support materials that place students in their Zone of Proximal Development (Taber, 2018). In this sense, the social support that is provided to the student while performing a task has been explored, not only in face-to-face interaction, but also computationally, during Information and Communication Technology (ICT) mediated learning in order to better understand how to support students in a new technology mediated environment (Alexander, Bresciani, & Eppler, 2015).

In fact, the concept of scaffolding has been applied in the design of computational scenarios and is a steadily growing strand of research. As a result, hypermedia and web-based learning environments that foster learning and self-regulatory processes are innumerable (Zhang & Quintana, 2012).

It is necessary to examine the resources of Information and Communication Technologies (ICTs), which have in their genetic makeup the potential to accommodate different languages, encourage social relationships and foster the elaboration of knowledge and knowledge, in a contextual manner (Limone, 2021).

Peer interaction in the learning process can promote the development of positive behaviors, self-confidence, and social-relational skills, all of which have a significant impact on the teacher's actions toward students and among students themselves (Thurston *et al.*, 2012).

Such processes of exchange and sharing require the activation of dynamics of social interdependence capable of promoting the assimilation of learning and the accommodation of new ideas, leading to the development of other cognitive understandings as a result of post-interactive metacognitive reflection (Casey & Fernandez-Rio, 2019).

The principle of co-construction of meaning, which is related to learning in collaborative settings, is in line with Vygotsky's sociocultural theory, which focuses on the assumption that action is socially mediated and cannot be separated from the environment in which it is performed (Vygotsky, 1978b).

1. Scaffolding: implications for learning processes

The principle of scaffolding refers to the support that an adult can provide to a child in order to promote and meet the child's learning goals (Wu & Pedersen, 2011). This concept was defined with reference to Vygotsky's sociocultural theory of learning and, in particular, based on the Zone of Proximal Development.

In learning contexts, it is well known that teachers should promote effective scaffolding that, alongside the structuring of valid learning activities, is able to support students. Such scaffolding, in learning environments, also refers not only to cognitive aspects but also to metacognitive and emotional aspects.

Devescovi (2003), analyzing scaffolding, classifies the five steps that Bruner, in turn, identifies as necessary for adults to promote scaffolding. Specifically, the following points are referred to:

1. recruitment: attracting attention and interest to motivate him to get involved;
2. reducing degrees of freedom: simplify the task as much as possible by reducing it to the minimum necessary steps;
3. guidance and encouragement: keep motivation high so that they can reach the goal on their own;
4. indication of critical points: highlight the salient aspects of the task so that the individual is aware of the discrepancies between what they have produced and what they should produce in order to achieve the objective;
5. demonstration: elaborate on the various attempts that have been made to solve the problem; subsequently, the student will elaborate on the model proposed by the adult and refine their own.

Belland (2014) has, in addition, declined the three characteristics of scaffolding:

- contingency: assessment of pupils' abilities with reference to precise tasks, so that the teacher can promote scaffolding;
- intersubjectivity: sharing of events, at a collective level, within which students can exchange ideas and experiment with problem-solving;
- transfer of responsibility: responsibility is manifested through the support provided by scaffolding and is linked to the principle of independence in learning.

In order to optimize the principle of scaffolding, it is good to deepen, in terms of knowledge, first of all, the skills and competencies of the student. This knowledge allows, in fact, to operate and implement strategies closely related to the development of the relative Zone of Proximal

Development. Moreover, such empowerment is promoted in a community context and aims to promote the development and consolidation of student autonomy. Teachers aiming to scaffold learning must, therefore, design learning activities and support materials that will situate students in their Zone of Proximal Development.

Park *et al.* (2020) point out different ways to reinforce in the learning context; one can, in fact, model and explain more complex procedures, simplify a task, prevent pupils from experiencing feelings of frustration, and provide students with functional examples of strategies.

Some strategies related to the scaffolding principle emerge from some studies in this regard: Verawati (in Rokhmat *et al.*, 2017) highlights the decomposition of the main task into several tasks in order to increase problem-solving ability in pupils. Wilson and Devereux (2014) emphasized the importance of design in breaking down into subtasks, highlighting the need for these tasks to be sequenced and structured so that they can lead to the completion of the main task.

It is, moreover, highlighted the need for appropriate scaffolding design in order to improve the consistency of student representation (Maries, Lin, & Singh, 2017). In this regard, explanatory examples appear to be: the use of digital technologies (Van de Pol, Volman, & Beishuizen, 2010), questions posed by the teacher (Meyer & Turner, 2002), and learning curriculum materials (Grossman & Thompson, 2008).

The use of learning protocols, prepared based on Scaffolding strategies, increased students' levels of knowledge of the strategies. In fact, Lajoie (2005) defines Scaffolding as an interaction between tools, guides, and strategies useful in supporting students in regulating learning. This refers to cognitive, emotional, metacognitive, and motivational processes (Ter Beek *et al.*, 2019).

Specifically, when scaffolds support metacognitive processes the following tasks are favored: planning, monitoring, self-assessment, and control of cognitive processes (López-Vargas, Ibáñez-Ibáñez, & Racines-Prada, 2017).

In addition, Molenaar (2010) states that metacognitive scaffolds aim to promote the management and regulation of cognitive processes; specifically, this provides support in:

- planning activities to achieve learning goals;
- monitoring progress on learning activities;
- evaluate the results in order to modify, if necessary, the task planning and adjust the related learning strategies.

This has also been confirmed by Hederich-Martinez, López-Vargas and Camargo-Uribe (2016), the authors highlight that these processes

allow students to make decisions and implement more effective and functional strategies to achieve the desired learning.

Another component, closely, intertwined with the principle of scaffolding is the emotional component. Schukajlow and Rakoczy (2016) point out that "emotions for outcomes are powerful variables that can be influenced in instructional settings and in turn affect motivation and performance". Emotions can, in fact, promote or hinder learning processes. Studies highlight, in fact, the implication of the emotional component, in learning processes, already in the early stages of development: research in this direction has found that good emotional regulation, in children, is correlated with good school performance (Djambazova-Popordanoska, 2016). In addition, emotional competence promotes the manifestation of prosocial behaviors, which, in turn, correlate with academic success (Trentacosta & Izzard, 2007).

The knowledge and in-depth study of this component helps to plan educational curricula that take into account the importance that emotional scaffolding has in promoting a positive climate in the classroom context; in managing students' arousal levels; and in keeping students' interest active and high (Huertas-Bustos, López-Vargas, & Sanabria-Rodríguez, 2018). Some declinations of emotional scaffolding relate to variables such as social context and friendship relationships (Reindle, Tulis, & Dresel, 2018), other approaches focus more on academic emotions such as: boredom, anxiety, enjoyment, interest and correlate these emotions with academic achievement and pre-determined goals (Pekrun *et al.*, 2002).

2. Scaffolding and metacognitive strategies in digital learning environments

It has previously been highlighted that scaffolding is an effective instructional strategy because it supports students' engagement with learning and, as a result, improves their achievement (Belland *et al.*, 2017). The research first focused on the principle of Scaffolding as an instructional strategy in traditional learning contexts, subsequently, it placed a focus on digital learning environments.

In fact, scaffolding has been applied in the design of hypermedia and transmedia learning environments: in order to foster learning and self-regulation processes (Zhang & Quintana, 2012).

In particular, some studies have investigated the possible associations between students' metacognition and relative cognitive styles. This comparison has been made taking into account the development and

enhancement performed by metacognitive scaffolding in computational environments (Doo, Bonk, & Heo, 2020). These scenarios aim to promote cognitive skill enhancement as a response to individual student differences and improved learning outcomes (Huertas *et al.*, 2017). It is also interesting to explore the potential of incorporating various types of computational Scaffolding during Information and Communication Technology (ICT) mediated learning to assess and manage the difficulties students face when adjusting their cognition during learning processes (Hederich-Martinez, López-Vargas, & Camargo-Uribe, 2016). The meta-analysis conducted by Doo *et al.* (2020) shows that scaffolding in a digital learning environment has a large and statistically significant effect with respect to learning goals. In addition, the analysis about the metacognitive, affective, and cognitive domain showed that the metacognitive domain produces a larger effect, thus, metacognitive scaffolding appears to be more effective than the other types of scaffolding. The study shows that scaffolding is, in addition, provided by digital tools; which are found to be highly functional. An example of exclusively digital scaffolding is Jill Watson: the first artificially intelligent teaching assistant (Maderer, 2017). Jill was highly valued during the course because she was perceived by students as kind and timely in providing answers; at the end of the semester, students discovered that Jill was a chatbot invented by their professor. This event provides an example of how scaffolding, in higher education, can promote the facilitation of learning and teaching, using Artificial Intelligence as a valuable support.

Engaging students in peer feedback, via digital tools, helps students reflect on their own opinions, peer opinions, and build meaningful knowledge (Fu & Hwang, 2018). The metacognitive model is being studied in the field of ICT applied to learning and education; in this perspective, it emerges that students with high metacognitive abilities show better learning outcomes and attitudes (Moos & Azevedo, 2008). In addition, strategies designed through metacognitive scaffolding can effectively support students with deficits in metacognitive skills and thus promote their effective learning (Kim & Hannafin, 2011).

However, such perspectives are little examined in the literature in higher education. Indeed, Brown (2020) points out that student populations are increasingly differentiated, implying the need for personalization of learning. By increasing online teaching, in higher education, the need for research on ad hoc scaffolding focused, exclusively, on online teaching in higher education increases accordingly.

3. Inclusive scaffolding

Inclusive education is a process that provides learning opportunities for all students and is, even today, a major challenge for the education system (Baldiris *et al.*, 2016). One of the strategies on which inclusive education is based is the principle of scaffolding, this concept has been declined previously and refers to the support that is provided to individuals during the early stages of learning. The purpose is to reduce effort and provide an opportunity for accountability where individuals are unable to operate independently (Slavin, 2019).

In this sense, scaffolding assumes a key role, in academic settings, for students with learning disabilities; indeed, this strategy improves the aforementioned outcomes and there are several studies to support it (Khodeir, Wanas, & Elazhary, 2018).

In one study, Widajati *et al.* (2019) investigate the learning outcomes of students with intellectual disabilities; the study involves two groups of students compared: in one group, students are supported by the scaffold and audio motion visual multimedia; in the other group, other students are supported by the same tool but not by the scaffold. It was found that students also supported by the scaffold achieve better learning outcomes than the unsupported group. Thus, in the construction of knowledge, students with difficulties are facilitated by the support and guidance of more experienced students in achieving increasingly optimal results (Ghazi, Amsyaruddin, & Irdamurni, 2018).

Zulfiana (2020) elaborates on the collaborative contextual method of scaffolding as a method aimed at providing support, by inclusive teachers, to students with special educational needs. This research refers to the analysis of the scaffolding process in this context: the study shows that classroom management, from an inclusive perspective, depends on various factors such as teachers' expertise, school facilities, and individual characteristics of each student. In addition, the research shows that teachers' scaffolding encourages students to achieve goals, in different forms, such as repetition, demonstration or providing special hours to enrich the material. The importance of teacher competence in managing the inclusive classroom is therefore highlighted: teachers have an indispensable role in providing all students with the same learning opportunities. In this regard, it is necessary that teachers have the appropriate training to ensure the use of different supportive approaches for all students with or without Special Educational Needs.

It is appropriate, in these dynamics, to integrate a variety of methodologies to increase the possibility of valuing the individual characteristics of students and also enhance the metacognitive sphere, that is, the aspects in

reference to knowing how to be and knowing how to learn through awareness about what one is doing and why one is doing it (Melero Rodríguez, Caon, & Brichese, 2019).

One approach to promote the development of learning, social, and metacognition skills is Peer Tutoring. This methodology involves the heterogeneous collaboration of peers to achieve a learning goal and enhance the cognitive, metacognitive, and emotional spheres.

4. Inclusive dynamics of Peer Tutoring

Within Vygotsky's sociocultural theory of human learning, social interaction plays a fundamental role in the development of cognition and the refinement of social-relational skills. Each function in the child's cultural development appears twice: first, at the social level and, later, at the individual level; first between people in an interpsychological dynamic and, later, within the child itself in an intrapsychological dynamic.

Vygotsky's cognitive theory has significantly influenced the theoretical and practical dimensions of education worldwide: knowledge and understanding are dynamically created by the person receiving external information (instead of inactively absorbing it) within relational contexts and co-construction of meanings (Vygotsky, 1978b).

Theoretical perspectives such as Vygotsky's zone of proximal development (Vygotsky, 1978a), Lave and Wenger's situated learning (Lave & Wenger, 2005), and Kelley's (1968) social interdependence theory recognize that peer interactions awaken students' potential, clarify their position relative to classmates, and help them create community.

Social interdependence theory integrates elements of individual and group performance, considering:

- the structuring of common goals;
- the establishment of positive interdependence and accountability among the parties involved in the teaching-learning process;
- the metacognitive reflection on performance in terms of learning gains.

The aforementioned theoretical foundations have prompted research to analyze and explore the social-relational dimension in formal settings.

Studies conducted have highlighted the positive effect of student-student interaction on increasing motivation and learning within inclusive classrooms that are able to support the holistic development of students with a Special Educational Needs (Topping *et al.*, 2012).

An "inclusive classroom" is defined as a type of context in which students with Special Educational Needs (e.g., students with visual impair-

ments, hearing disabilities, physical disabilities, as well as students who are slow in learning or even gifted) are co-present, who constructively and synergistically confront and mix with neurotypical students to learn together in collaborative learning dynamics (Casey & Fernandez-Rio, 2019).

In this context, Peer Tutoring is classified as a type of cooperative learning in which students become learning partners and the teacher acts as a facilitator (Miquel & Duran, 2017).

This methodology fits within a conceptual framework that incorporates teacher-imparted instruction within peer-mediated reciprocal interactions, the ultimate goal of which involves optimizing personal functioning and holistic development of the parties involved.

In this way, each student is encouraged to respect and treat their classmates as worthy neighbors (Weiss, Muckenthaler, & Kiel, 2020). This gives them the opportunity to create a space that can break through any architectural barriers and prejudices (Okilwa & Shelby, 2010).

The interaction and sharing of information among the students generate an exchange of knowledge and effective strategies for problem solving and even positive attitudes (Falchikov, 2001); it promotes an active involvement of the students who work together within a space of sharing and negotiation of meanings in which one of the students assumes the role of tutor and the other the role of tutee. These two figures confront each other in a sort of "cognitive challenge" and enact a post-interactive restructuring of the intervention bestowed by the tutor (Thurston *et al.*, 2012).

Both the tutor and the tutee must try to perform their roles as effectively as possible. This creates a social interdependence between the parties: the individual successes of the tutor and tutee are linked by common goals and gains and mutual interdependence. Without tutors and tutees performing their tasks according to prescribed patterns for interaction, neither can benefit from the interaction itself: tutors help tutees with Special Educational Needs structure their knowledge within their zone of proximal development to enhance their comprehension skills and cognitive development, and simultaneously, tutors develop a range of cross-cutting skills as a result of the tutoring experience (Topping *et al.*, 2011).

In this regard, several studies have shown that Peer Tutoring can be a particularly beneficial tool for students in areas of high social disadvantage and those with Special Educational Needs. In fact, Peer Tutoring can contribute to the inclusion of the student with Special Educational Needs and promote the development of his or her ability to respond to the activities proposed in the classroom, promoting his or her effective and concrete participation resulting in academic and social improvements (Casey & Fernandez-Rio, 2019).

Recent research conducted in nine schools in Indonesia and specifically in the regency of East Sumba found that Peer Tutoring has a significant impact not only on the development of purely academic skills, but also and more importantly on the formation and character change of students and indirectly of the teacher, who becomes more capable and flexible in organizing and managing inclusive learning in a more functional way (Manubey, Batlolona, & Leasa, 2021).

Teaching character to students is as important as teaching academic knowledge and skills. This assumption prompted the aforementioned research in activating inclusive learning implementation plans for character building based on Peer Tutoring. Analysis of the data revealed an increase in patience, trust, and mutual respect: students involved in the research became more friendly, respectful, patient, helpful, and responsible towards students with Special Educational Needs (Slavin, 2015).

Speaking of Special Educational Needs, an interesting, 2004 research study at the Open University in Israel offered Peer Tutoring for students with Specific Learning Disorders in higher education settings (Vogel, Fresko, & Wertheim, 2007).

Students with Specific Learning Disorders face a variety of difficulties during their school and college journey. A summary of the difficulties encountered (Skinner & Lindstrom, 2003) includes:

- deficits in study skills, such as preparation, note-taking, and listening comprehension;
- problems with organizational skills;
- difficulties with social responsiveness;
- deficits in specific academic areas (reading, writing, numeracy, text comprehension);
- low self-esteem.

The explicit purpose of this Peer Tutoring project included providing concrete help for students with a Learning Disorder and, in addition, sought to understand the tutoring process from the perspective of both tutors and tutees in the following areas:

- student needs;
- focus of tutoring activities;
- difficulty of tutoring activities;
- similar study experiences;
- satisfaction with the project.

Students with Learning Disorder reported memory problems and difficulty with sustained concentration. However, they also reported greater proficiency in using adaptive techniques and compensatory strategies that were more effective and functional than those used prior to the

university period and following the tutoring experience (Blake & Rust, 2002).

Concurrently, the results of additional studies show that Peer Tutoring not only provides good social interaction outcomes through acceptance and respect for "differences", but also appears to be a more effective teaching-learning practice than conventional teaching methods because it fosters greater student participation and engagement (Mehwish & Aalyia, 2015; Thurston, Cockerill, & Chiang, 2021).

5. Online Peer Tutoring in higher education

Given the obvious potential for student-student interactions in face-to-face classrooms, the lack of student-student interaction in online modes may be a legitimate concern for faculty and collegiate administrators. However, a growing body of recent research has focused on positive interactions in fully online and blended courses, with important implications in distance education (Brown, 2001; Meyer, 2004), including, for example, the presence of positive correlations between students' social behavior and persistence in college.

Most studies of online interactions mediated by the Peer Tutoring methodology analyze asynchronous and synchronous communicative dynamics; they are capable of triggering fruitful dialogue among students in distance learning courses (Hou & Wu, 2011) and building a community of tutors and tutees across geographic barriers (Jegede, 2002).

As an example, based on the assumption that educational technology is a powerful tool that can help manage, organize, and disseminate knowledge while empowering students in the learning process, a 2013 study designed a web-based tutoring system called OPAL (Online Peer-Assisted Learning), whose goal was to coordinate effective dyadic peer tutoring for large courses. Specifically, such a tutoring system was piloted in an undergraduate blended organic chemistry course of 250 students in the Department of Chemistry at the University of Illinois (Evans & Moore, 2013). From a research perspective, the focus was on evaluating the distance interaction between students and how that relationship translated into significant learning gains and improved problem-solving skills. Research findings indicated that Online Peer Tutoring had a positive effect on student-student interaction and student learning with respect to digital problem solving (Bonk, Wisher, & Lee, 2004).

Over the past decade, a growing number of empirical studies have been published that consider the task and role of facilitators and/or media-

tors in the context of Computer Supported Collaborative Learning (CSCL) (Garrison, Anderson, & Archer, 2000; Salmon, 2000; Lazonder, Wilhelm, & Ootes, 2003; Bonk, Wisher, & Lee, 2004; Rickard, 2004).

In a 2008 study, peer tutors took on the role of mediator in a CSCL environment. In the aforementioned study, Peer Tutoring was implemented in a higher education setting in which students enrolled in the Department of Education at Ghen University in Belgium acted as online tutors to support freshmen in the asynchronous discussion of authentic problem solving (De Smet, Van Keer, & Valckle, 2008).

The present study aimed to obtain information about tutors' behavior in asynchronous discussion groups. Tutors' interventions were studied by means of an analysis scheme based on Salmon's E-Moderation model (Salmon, 2000).

In general, this model provides for the figure of a specialized tutor, called "E-Tutor" or "E-Moderator", who has a fundamental role in the learning process, within which technology is placed as the most functional means to achieve certain training objectives.

The tutor must assume a capacity of guidance and moderation and can present the following profiles or subtypes: "motivator", "informer", "knowledge builder" or "facilitator".

The E-Moderator, then, performs technical support and moderation activities that Salmon traces through the five phases of his learning/teaching model (*Fig. 1*):

1. Access and motivation: the tutor set up the environment, facilitates access, welcomes, encourages, and reassures; systematically monitors and controls the learning process; and provides emotional support to the tutee.
2. Online socialization: parties involved define their online identities to initiate a process of socialization and interaction. The tutor facilitates relationships, encourages participation, and presides over communication.
3. Information exchange: the tutor provides and receives information, develops strategies to manage information flow, suggests strategies for guidance, and stimulates constructive exchange of new information through discussion.
4. Knowledge construction: the tutor facilitates the process of knowledge development, orients the reflections and discussions, solicits the participation of the trainees, does not provide solutions, but helps to broaden their own and others' point of view by appreciating different perspectives in order to co-construct knowledge.
5. Development: the tutor refines the skills of argumentation and moderation, encourages metacognitive reflection on the learning process and the development of critical thinking.

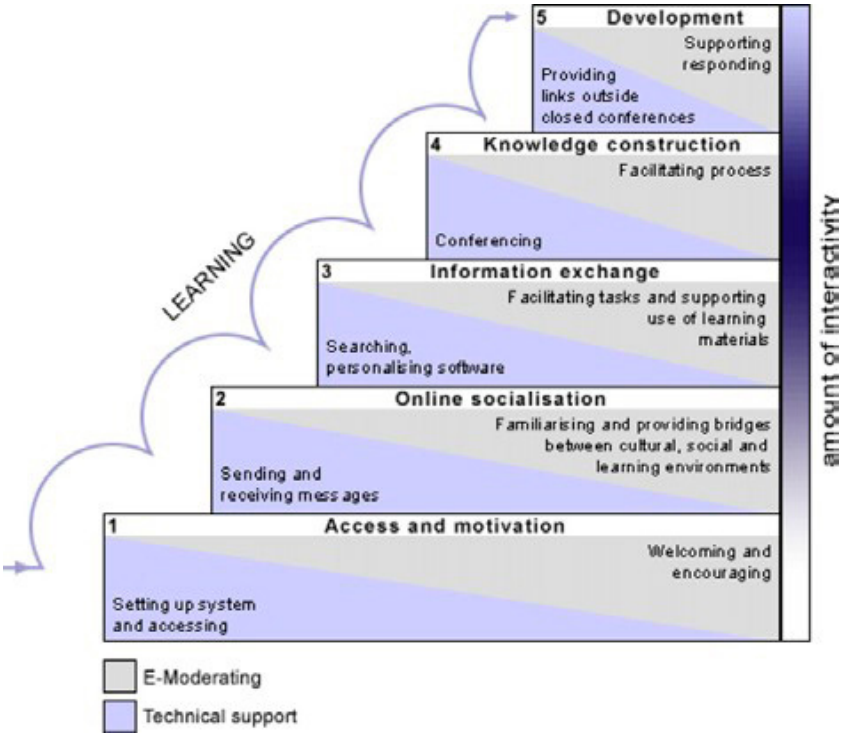

Figure 1. – Five-step model for E-Moderating from Salmon (2000).

This model aims for a guided exchange activity that, in the fifth phase, results in self-regulated contributions from students.

Throughout the various stages of the model, interactions developed during the conducted study that promoted the development of higher-order cognition, which allowed students to develop as independent thinkers during online discussions (Falchikov, 2001).

Conclusions

In the present article, some studies have been reviewed in order to better define the principle of scaffolding and the methodology of Peer Tutoring as a promotion of learning support in educational and academic dynamics. It has emerged that the principle of scaffolding is an approach that, even today, has strong scientific implications.

In fact, although its roots in its definition in Vygotsky (1978b) is, today, a theoretical cornerstone that is declined through the new learning environments.

In particular, it has emerged how scaffolding is fundamental in the design and promotion of metacognitive skills in students who experience instruction in computational scenarios (Hederich-Martinez, López-Vargas, & Camargo-Uribe, 2016).

Moreover, this principle also assumes a key role in the management of the classroom and, in particular, the inclusion of all students: an important declination is, in fact, assumed by Peer Tutoring. The additional values and benefits of social interaction promoted by Peer Tutoring practices in education are also evident in the university context (Hrastinski, 2008).

From the analysis of the aforementioned studies, there is a need for future research to investigate in more detail the distinct and mixed effects of contextual circumstances on tutor performance in inclusive higher education settings and to better understand the impact of inter-individual differences on the behavior enacted by tutors and tutees. In addition, it may be of interest to examine the relationship between the behavior exhibited during tutoring and the quality of tutors' contributions in synchronous and asynchronous online discussion groups (Falchikov, 2001).

It is necessary to implement a profound redefinition of methodological proposals, curricular frameworks and educational objectives within a transmedia educational system. The conscious acquisition of digital languages and tools can, therefore, represent a real opportunity to promote educational innovation and a transformation of cultural paradigms (Limone, 2021).

References

Alexander, E., Bresciani, S., & Eppler, M. J. (2015). Knowledge scaffolding visualizations: A guiding framework. *Knowledge Management & E-Learning: An International Journal*, *7*(2), 179-198.

Baldiris, S., Zervas, P., Fabregat, R., & Sampson, D. G. (2016). A teacher professional development program for designing inclusive learning experiences. *Educational Technology & Society*, *19*(1), 17-27.

Belland, B. R. (2014). Scaffolding: Definition, current debates, and future directions. In M. Spector, M. D. Merrill, J. Elen, & M. J. Bishop (Eds.), *Handbook of research on educational communications and technology* (pp. 505-518). Springer, New York.

Belland, B. R., Walker, A. E., Kim, N. J., & Lefler, M. (2017). Synthesizing results from empirical research on computer-based scaffolding in STEM education: A meta-analysis. *Review of Educational Research*, *87*(2), 309-344.

Blake, T. R., & Rust, J. O. (2002). Self-esteemand self-efficacy of college students with disabilities. *College Student Journal*, *36*, 214-222.

Bonk, C. J., Wisher, R. A., & Lee, J.-Y. (2004). Moderating learner-centred e-learning: Problems and solutions, benefits and implications. In T. S. Roberts (Ed.), *Online collaborative learning: Theory and practice* (pp. 54-85). Idea Group Publishing.

Brown, P. S., Cohn, A. G., Hart, G., & Dimitrova, V. (2020). Contingent scaffolding for system safety analysis. In *International Conference on artificial intelligence in education* (pp. 395-399). Springer, Cham.

Brown, R. (2001). The process of community-building in distance learning classes. *Journal of Asynchronous Learning Networks*, *5*(2), 18-35.

Casey, A., & Fernandez-Rio, J. (2019). Cooperative learning and the affective domain. *Journal of Phyical Education Recreation & Dance*, *90*(3), 12-17.

De Smet, M., Van Keer, H., & Valcke, M. (2008). Blending asynchronous discussion groups and peer tutoring in higher education: An exploratory study of online peer tutoring behaviour. *Computers & Education*, *50*(1), 207-223.

Devescovi, A., Marchione, D., Capobianco, M., & Bentrovato, S. (2003). *Psicologia del bambino in età prescolare*. Edizioni Kappa.

Djambazova-Popordanoska, S. (2016). Implications of emotion regulation on young children's emotional wellbeing and educational achievement. *Educational Review*, *68*(4), 497-515.

Doo, M. Y., Bonk, C., & Heo, H. (2020). A meta-analysis of scaffolding effects in online learning in higher education. *International Review of Research in Open and Distributed Learning*, *21*(3), 60-80.

Evans, M. J., & Moore, J. (2013). Peer tutoring with the aid of the Internet. *British Journal of Educational Technology*, *44*(1), 144-146.

Falchikov, N. (2001), *Learning together: Peer tutoring in higher education*. Routledge Falmer.

Fu, Q. K., & Hwang, G. J. (2018). Trends in mobile technology-supported collaborative learning: A systematic review of journal publications from 2007 to 2016. *Computers & Education*, *119*(1), 129-143.

Garrison, R. D., Anderson, T., & Archer, W. (2000). Critical inquiry in a text-based environment: Computer conferencing in higher education. *The Internet and Higher Education*, *2*(2-3), 87-105.

Ghazi, R. H., Amsyaruddin, A., & Irdamurni, I. (2018). Video Tutorial untuk Meningkatkan Keterampilan Memasang Kampas Rem bagi Anak Tunagrahita Ringan. *Jurnal Pendidikan Kebutuhan Khusus*, *2*(1), 7-12.

Grossman, P., & Thompson, C. (2008). Learning from curriculum materials: Scaffolds for new teachers? *Teaching and Teacher Education*, *24*(8), 2014-2026.

Hederich-Martínez, C., López-Vargas, O., & Camargo-Uribe, A. (2016). Effects of the use of a flexible metacognitive scaffolding on self-regulated learning during virtual education. *International Journal of Technology Enhanced Learning*, *8*(3-4), 199-216.

Hou, H.-T., & Wu, S.-Y. (2011). Analyzing the social knowledge construction behavioral patterns of an online synchronous collaborative discussion instructional activity using an instant messaging tool: A case study. *Computers & Education*, *57*(2), 1459-1468.

Hrastinski, S. (2008). The potential of synchronous communication to enhance participation in online discussions: A case study of two e-learning courses. *Information & Management*, *45*(7), 499-506.

Huertas, A., López, O., & Sanabria, L. (2017). Influence of a metacognitive scaffolding for information search in b-learning courses on learning achievement and its relationship with cognitive and learning style. *Journal of Educational Computing Research*, *55*(2), 147-171.

Huertas-Bustos, A., López-Vargas, O., & Sanabria-Rodríguez, L. (2018). Effect of a metacognitive scaffolding on information web search. *Electronic Journal of e-Learning*, *16*(2), 91-106.

Jegede, O. J. (2002). Facilitating and sustaining interest through an on-line distance peer-tutoring system in a cooperative learning environment. In V. Phillips, B. Elwert, L. Hitch, & C. Yager (Eds.), *Motivating and retaining adult learners online* (pp. 1-151). GetEducated.com, LLC.

Kelley, H. (1968). Interpersonal accommodation. *American Psychologist*, *23*(6), 399-410.

Khodeir, N., Wanas, N., & Elazhary, H. (2018). Constraint-based student modelling in probability story problems with scaffolding techniques. *International Journal of Emerging Technologies in Learning (iJET)*, *13*(1), 178-205.

Kim, M. C., & Hannafin, M. J. (2011). Scaffolding problem solving in technology-enhanced learning environments (TELEs): Bridging research and theory with practice. *Computers & Education*, *56*(2), 403-417.

Lajoie, S. P. (2005). Extending the scaffolding metaphor. *Instructional Science*, *3*(5), 541-557.

Lave, J., & Wenger, E. (2005). *Situated learning: Legitimate peripheral participation*. Cambridge University Press.

Lazonder, A. W., Wilhelm, P., & Ootes, S. A. W. (2003). Using sentence openers to foster student interaction in computer-mediated learning environment. *Computers & Education*, *41*(3), 291-308.

Lee, Y. F., Lin, C. J., Hwang, G. J., Fu, Q. K., & Tseng, W. H. (2021). Effects of a mobile-based progressive peer-feedback scaffolding strategy on

students' creative thinking performance, metacognitive awareness, and learning attitude. *Interactive Learning Environments*, 1-17. doi: 10.1080/10494820.2021.1916763

Limone, P. (2021). *Ambienti di apprendimento e progettazione didattica. Proposte per un sistema educativo transmediale*. Carocci.

López-Vargas, O., Ibáñez-Ibáñez, J., & Racines-Prada, O. (2017). Students' metacognition and cognitive style and their effect on cognitive load and learning achievement. *Journal of Educational Technology & Society*, *20*(3), 145-157.

Maderer, J. (2017). *Jill Watson, Round Three, Georgia Tech course prepares for third semester with virtual teaching assistants*. Georgia Tech News Center.

Manubey, J., Batlolona, J. B., & Leasa, M. (2021). Peer tutoring analysis in inclusive classes using character education approach. *Journal of Education and Learning*, *15*(2), 303-311.

Maries, A., Lin, S. Y., & Singh, C. (2017). Challenges in designing appropriate scaffolding to improve students' representational consistency: The case of a Gauss's law problem. *Physical Review Physics Education Research*, *13*(2), 020103.

Mehwish, H., & Aalyia, Y. (2015). Significance of scaffolding and peer tutoring in the light of Vygotsky's theory of Zone of Proximal Development. *International Journal of Languages, Literature and Linguistics*, *1*(3), 170-173.

Melero Rodríguez, C. A., Caon, F., & Brichese, A. (2019). Educazione linguistica accessibile e inclusiva. Promuovere apprendimento linguistico efficace per studenti stranieri e studenti con DSA. *EL.LE*, *7*(3), 341-366.

Meyer, D. K., & Turner, J. C. (2002). Using instructional discourse analysis to study the scaffolding of student self-regulation. *Educational Psychologist*, *37*(1), 17-25.

Meyer, K. A. (2004). Evaluating online discussions: Four different frames of analysis. *Journal of Asynchronous Learning Networks*, *8*(2), 101-114.

Miquel, E., & Duran, D. (2017). Peer learning network: Implementing and sustaining cooperative learning by teacher collaboration. *Journal of Education Teaching*, *43*(3), 349-360.

Molenaar, I., Van Boxtel, C. A., & Sleegers, P. J. (2010). The effects of scaffolding metacognitive activities in small groups. *Computers in Human Behavior*, *26*(6), 1727-1738.

Moos, D. C., & Azevedo, R. (2008). Monitoring, planning, and self-efficacy during learning with hypermedia: The impact of conceptual scaffolds. *Computers in Human Behavior*, *24*(4), 1686-1706.

Okilwa, N. S., & Shelby, L. (2010). The effects of peer tutoring on academic performance of students with disabilities in grades 6 through 12: A synthesis of the literature. *Remedial Special Education*, *31*(6), 450-463.

Park, M. H., Tiwari, A., & Neumann, J. W. (2020). Emotional scaffolding in early childhood education. *Educational Studies*, *46*(5), 570-589.

Pekrun, R., Goetz, T., Titz, W., & Perry, R. P. (2002). Academic emotions in students' self-regulated learning and achievement: A program of qualitative and quantitative research. *Educational Psychologist*, *37*(2), 91-105.

Reindle, M., Tulis, M., & Dresel, M. (2018). Associations between friends, academic emotions and achievement: Individual differences in enjoyment and boredom. *Learning and Individual Differences*, *62*, 164-173.

Rickard, K. (2004). E-mentoring and pedagogy: A useful nexus for evaluating online mentoring programs for small business? *Mentoring and Tutoring*, *12*, 383-401.

Rokhmat, J., Marzuki, M., Hikmawati, H., & Verawati, N. N. S. P. (2017). The scaffolding causalitic-thinking approach to increase the problem-solving ability of students on fluids. *Science, Engineering, Education, and Development Studies (SEEDS): Conference Series 1*(1). https://dx.doi.org/10.20961/seeds.v1i1.20276

Salmon, G. (2000). *E-Moderating: The key to teaching and learning online*. Kogan Page.

Schukajlow, S., & Rakoczy, K. (2016). The power of emotions: Can enjoyment and bore dom explain the impact of individual preconditions and teaching methods on interest and performance in mathematics? *Learning and Instruction*, *44*, 117-127.

Shirmohammadi, M., & Salehi, M. (2017). Comparative effect of scaffolding instruction and self-regulated learning on ESP learners' reading comprehension. *Studies*, *5*(4), 203-213.

Skinner, M. E., & Lindstrom, B. D. (2003). Bridging the gap between high schooland college: Strategies for the successful transition of students with learning disabilities. *Preventing School Failure*, *47*, 132-138.

Slavin, R. E. (2015). Cooperative learning in elementary schools. *International Journal of Primary, Elementary and Early Years Education*, *43*(1), 5-14.

Slavin, R. E. (2019). *Educational psychology: Theory and practice*. Pearson.

Taber, K. S. (2018). Scaffolding learning: Principles for effective teaching and the design of classroom resources. In M. Abend (Ed.), *Effective teaching and learning: Perspectives, strategies and implementation* (pp. 1-43). Nova Science Publishers.

Ter Beek, M., Opdenakker, M. C., Spijkerboer, A. W., Brummer, L., Ozinga, H. W., & Strijbos, J. W. (2019). Scaffolding expository history text reading: Effects on adolescents' comprehension, self-regulation, and motivation. *Learning and Individual Differences*, *74*.

Thurston, A., Burns, V., Topping, K. J., & Thurston, M. J. (2012). Social effects of peer tutoring in elementary schools. Paper presented at *2012 AERA annual Meeting, Vancouver, Canada*.

Thurston, A., Cockerill, M., & Chiang, T.-H. (2021). Assessing the differential effects of peer tutoring for tutors and tutees. *Education Sciences*, *11*(3).

Topping, K. J., Miller, D., Thurston, A., McGavock, K., & Conlin, N. (2011). Peer tutoring in reading in Scotland: Thinking big, *Literacy*, *45*(1), 3-9.

Topping, K. J., Thurston, A., McGavock, K., & Conlin, N. (2012). Outcomes and process in reading tutoring. *Educational Research*, *54*, 239-258.

Trentacosta, C. J., & Izzard, C. E. (2007). Kindergarden children's emotion competance as predictor of their academic competance in first grade. *Emotion*, *7*(1), 77-88.

Van de Pol, J., Volman, M., & Beishuizen, J. (2010). Scaffolding in teacher–student interaction: A decade of research. *Educational Psychology Review*, *22*(3), 271-296.

Vogel, G., Fresko, B., & Wertheim, C. (2007). Peer tutoring for college students with learning disabilities: Perceptions of tutors and tutees. *Journal of Learning Disabilities*, *40*(6), 485-493.

Vygotsky, L. S. (1978a). *Mind in society: The development of higher psychological processes*. Harvard University Press.

Vygotsky, L. S. (1978b). Socio-cultural theory. *Mind in Society*, *6*, 52-58.

Weiss, S., Muckenthaler, M., & Kiel, E. (2020). Students with emotional and behavioral problems in inclusive classes: A critical incident analysis. *Journal of Emotional and Behaviour Disorder*, 1-36. doi: https://doi.org/10.1177/1063426620967286

Widajati, W., Purbaningrum, E., Mahmudah, S., Ainin, I. K., Dewi, L., & Rianto, E. (2019). Scaffolding task analysis and multimedia in development life skill intellectual disability student. In *3rd international Conference on special education – ICSE, 2019*. Atlantis Press.

Wilson, K., & Devereux, L. (2014). Scaffolding theory: High challenge, high support in Academic Language and Learning (ALL) contexts. *Journal of Academic Language and Learning*, *8*(3), A91-A100.

Wu, H. L., & Pedersen, S. (2011). Integrating computer- and teacher-based scaffolds in science inquiry. *Computers & Education*, *57*(4), 2352-2363.

Zhang, M., & Quintana, C. (2012). Scaffolding strategies for supporting middle school students' online inquiry processes. *Computers & Education*, *58*(1), 181-196.

Zulfiana, U., & Suen, M. W. (2020). An analysis of a scaffolding collaborative contextualmethod of inclusive teacher toward the students with special needs in elementary school. In *5th ASEAN Conference on psychology, counselling, and humanities – ACPCH, 2019* (pp. 153-159). Atlantis Press.

Riassunto

Il presente lavoro mira ad indagare i riferimenti teorici che la letteratura offre rispetto al principio di scaffolding e alla metodologia del Peer Tutoring declinati in ottica inclusiva. Il principio di scaffolding affonda, infatti, le sue radici alle prime definizioni ad opera di Vygotskij (1978a) che va a definire lo stesso come il supporto sociale fornito allo studente durante il completamento di un compito di apprendimento per risolvere un problema o per raggiungere un obiettivo. Successivamente, tale principio è stato declinato in ottica inclusiva rispetto alla gestione della classe e rispetto ai nuovi ambienti di apprendimento transmediali. Una declinazione che risulta essere efficace fa riferimento al Peer Tutoring. Tale metodologia mira a promuovere le interazioni reciproche mediate dai pari al fine di ottimizzare il funzionamento individuale e promuovere lo sviluppo olistico delle parti coinvolte.

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