

Demands and Realities: Significance and Implications of Galperin's Legacy for Learning and Teaching in 21st Century

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Learning and Teaching in the 21st Century

The fourth industrial revolution (Collins & Halverson, 2018; Kaplan & Haenlein, 2016), unprecedented climatic events, rising nationalism and racism, considerable demographic movements and rapid technological advances affect all areas of society. These challenges highlight the need for educating professionals who can respond to the demands and realities of such evolving societies (Laurillard, 2002; Sahlberg, 2010; Zepke, 2008). The recent global impact of the COVID-19 pandemic has caused significant transformational changes in the lives of people across the globe (Mishra, 2020). The nature of employment, schooling, communication and interaction has changed fundamentally in just a few months. In such circumstances, the professionals' capacity for creating stronger links between theory and practice, and continuous learning about the world around us, is crucial. For years' traditional education has been based primarily on the principle of knowledge transfer: from older to younger generations, from textbooks to readers and teachers to students. Recent transformational events indicate the need to reconsider approaches for educating 21st century citizens in preparation for current changes and related uncertainties. Students are expected not only to acquire knowledge, but also to have the ability to apply it in various situations. However, of greater significance (together with knowledge acquisition and its practical application) is developing learners' understanding of how to engage in the process of knowledge creation and enhancing their capacity in learning

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to learn (Engeness, 2018; Smith, et al., 2016). Such an approach urges consideration of the role of the teacher and student (Selwyn, 2016) and is related to wider questions about what learning is and what we want education in 21st century to be.

During the 1970s, Säljö suggested that learning was an ongoing process rather than a finite product (Saljo, 1979). Such an understanding resonates with “conscientious learning” (Rogers, 2003, p. 26), where individuals have full awareness of engagement in a task that involves some form of learning and consequently learning itself becomes a task. Similarly, Claxton reminds us of Albert Einstein’s words: Education is what remains after one has forgotten everything one learned at school (Claxton, 2013, p. 2). These words position education as an understanding of learning; the capacity to engage in learning and develop as a learner. The purpose of this article is to build upon these foundations by presenting Galperin’s legacy as a consolidation and extension of ideas of Vygotsky and Leontiev which offers a valuable approach to enhance learning and development of students as lifelong learners.

The Continuity of the Contributions: Vygotsky, Leontiev and Galperin

Vygotsky’s was the first to adopt a non-dualist approach to mind and society by offering a social, historical approach to understanding the development of human consciousness (Leontiev, 2005). Consequently, in order to understand cognition, one should turn to real life, which is stimulated by the development of relationships among humans involved in practical activities through the use of tools (Vygotsky, 1980). Vygotsky considered tools, both material and conceptual, as mediational means that connected individual and society. He argued that tool mediation during practical activity created changes in human consciousness and that these tools acquired special meanings: tools-signs. The material tools used in the practical activity were directed outside and connected the person with the surrounding environment; whereas the tools-signs were directed inside and caused the changes in human consciousness (Vygotsky, 1986). Therefore, the tools-signs a person operates with on the internal plane are of material origin. Language constitutes the system of signs that mediates human psychological activity, which also repeats within the pathway of internalisation. First, externally as communication with others and then individually in the form of inner speech which has evolved as a particular form of human social relationships originated in practical work (Vygotsky, 1986). Human consciousness, therefore, develops within new social relationships that arise in the course of practical activity (speech) and is the product of human culture (language). Hence, the cultural-historical origin of human consciousness (Leontiev & Luria, 1999).

While Vygotsky was very clear about the primary role of a practical activity in the development of human consciousness, he focused on investigating the role of tools, placing less importance on the role of the activity that employed these tools. However, Leontiev and Luria (1999) argued that the presence of tools, although important, did not fully explain the relationships that emerged in the course of human activity. Leontiev suggested that neither concepts and meanings, nor tools and signs on their own, but life itself, determined the development of human consciousness (Leontiev, 1978). Consequently, he identified the activity connecting an individual with the surrounding environment as a subject of psychology (Leontiev, 1978). Attention

was directed at examining the structure of the activity with the purpose and motive of crucial importance. Introducing the notions of action, activity and operations, an action was explained as the active attitude of the subject to reality characterised by the concurrence of the motive and purpose: the action of a subject was caused by a purpose and was directed towards achieving it (Leontiev, 1978). An activity was initiated by a motive realised in the course of the activity and operations were a means of realisation of the activity, adequate not to the purpose or the motive, but the conditions in which the activity was carried out. In line with Vygotsky, Leontiev suggested that learning happens in the process of transformation of human external practical social activity into internal, ideal activity. However, even on the ideal internal plane the activity retains its structure and is directed towards solving tasks, emerging from the person's interaction with the surrounding environment. In this way, human consciousness is not viewed as the opposite of external activity, but as originated in and transformed from the external activity. Such an approach allowed Leontiev to argue that human consciousness and external activity are linked together as one is a product of another. On the one hand, this means that external and internal activities have a similar structure consisting of actions, activities and operations; while the similarity in the structure allows mutual transformations between the external practical activity and human consciousness.

The principles of the activity approach to studying psychology, the social nature of human psychological activity and the unity of the external practical and the internal psychological activities posed a further question about how external activities transform into internal activities. Galperin provided an answer to this question by connecting the advances made by Leontiev with the legacy of Vygotsky. Galperin's contribution centred on the question of how the mental, psychological (Vygotsky's legacy) emerges out of the "material", non-psychological (Leontiev's legacy). His approach was based on three premises: (a) the leading role of teaching and learning in development; (b) conceptual development involves material or materialised actions; and (c) a recognition of the importance of cultural tools and social interaction in human development (Engeness & Lund, 2018).

Galperin's Legacy: Learning as an Orienting Activity and a Process of Dialectical Transformations

Following Vygotsky and Leontiev, Galperin believed that new types of psychological activities were initially formed on the external plane in the material form in the course of social activities and were transferred to the internal, psychological form.

... ideal in nothing else but material transferred to the human head and transformed in it (Lecture 1).

To start with, we need to find out how actions are first formed as external actions with objects and then transferred to the internal plane. As a result of this transfer, external actions undergo changes, which make them totally unrecognisable and they begin to look like mental processes (Lecture 2).

Galperin's contribution was in describing how this transformation happens. The research conducted by Galperin identified that a learning activity comprised three

parts: orienting, executive and controlling (Galperin, 1968). Orientation was of particular significance in any learning activity, requiring careful planning of the type of orientation learners were going to be exposed to in the executive part of the learning activity. Orientation was understood by Galperin as necessary information about (i) the activity in which learners were to engage (ii) the potential of available resources and (iii) how learners were to engage in the learning activity. Galperin argued that orientation can be specific for a particular task or it can be used in several situations. In addition, orientation can be either supplied to the learner in its final form for use in a learning activity, or it can be constructed by learners. The construction of the orientation by learners, in turn, can happen either by the method of trial and error or by the approach offered by the teacher. Based on these premises, Galperin identified three types of the orientation: (i) incomplete, where mediational tools and the essential characteristics of the concept are identified by learners through trial and error. In this case, learning happens slowly with many mistakes and the activity of learning is extremely sensitive to the slightest changes in conditions; (ii) complete, where learners are informed about all the essential characteristics of the concept necessary to solve a particular problem. However, these essential characteristics are specific and can be used only in one case, for example, when solving a particular problem. Learning happens quickly and with minimum mistakes; however, the transfer of the skills formed in the course of such activity is possible only when there is close similarity in the learning situations and (iii) complete but constructed by learners following the approach offered by the teacher aimed at identifying the essential features of the target concept. By using the approach offered to the learners by the teacher, a specific orientation can be constructed by learners suited for the particular case. With the third type of orientation (complete but being constructed by learners following an offered approach), learning happens quickly, with minimum mistakes and the skills formed in the course of this activity can be transferred to other learning situations.

Galperin emphasised that the second type of orientation (complete and provided to learners) develops empirical thinking with learners without getting into the essence of the phenomena; whereas the third type of orientation reveals the essence of learning and promotes theoretical abstract thinking. The third type offers a unified approach to learning and forms the basis for creating links between sciences and approaches to studying them. By applying the third type of orientation learners master the essence of learning through studying a phenomenon which carries a new function: not as a studied object, but as a tool for studying the essence of the learning. In doing so, students develop their understanding about the nature of the activity of learning across contexts and subject areas and their agency as learners is being enhanced.

The orienting part of a learning activity was considered by Galperin as a 'managing device' whereas the executive part was seen as a 'working device' transferring the activity from the external plane to the internal. For Galperin, the transformation of the learning activity was described by the measure of its acquisition by learners engaged in the activity i.e. when transferred from the social external to the internal plane.

During 20 years of research, Galperin outlined the dialectically developing forms this transformation may go through: (1) *motivation*, (2) *orientation*, (3) *materialised*

action, (4) *communicated thinking*, (5) *dialogical thinking*, and (6) *acting mentally* (Galperin, 2002). In the initial *motivational form*, a learner's attitude and relation to the learning outcomes that have to be achieved is formed. In the *orientation form*, Galperin identified three types of orientation which are presented in detail above. In the third form of a *materialised action* learners interact with material (real objects) or materialised objects (models, simulations, animations, schemes, etc.), and over time become less dependent on the material support they give and more aware of the meanings they carry. Speech becomes the main guiding tool in the fourth form, *communicated thinking*, which reflects learners' activity with material or materialised objects. It should be noted that communicated thinking does not imply learners' ability to explain the activity they are involved in, but to complete the activity by talking, for example, to solve target problems in speech. In the form of communicated thinking an activity already acquires the characteristics of ideal, theoretical activity, but it is still 'visible' and available for monitoring from outside. The fifth form, *dialogical thinking*, establishes a dialogue of a learner with him or herself so that the activity is being transformed mentally. In dialogical thinking a mental activity: (i) presents itself as a reflection of the materialised activity on the ideal plane where material or materialised objects are substituted with their images; (ii) is directed to the images of the material or materialised objects and (iii) reflects learners' ability to perform the activity with the images of the material or materialised objects mentally. The transformation of students' learning that happens from communicated thinking to dialogical thinking happens by substituting the externally oriented speech with its image. In dialogical thinking the activity is directed inside the learner establishing communication with himself (as another person). Learners' ability to perform an activity in the form of dialogical thinking reflects the pathway the activity has undergone from its materialised to dialogical form. In the final form of *acting mentally*, an activity has become a pure mental act with the focus on its outcome. The activity is performed with the inner speech that does not include a dialogue with a learner as 'another person' but becomes a purely individual activity completed by means of mental images and meanings that help a learner to deal with similar or differing situations on the basis of previous experience.

Galperin's study of orientation and his understanding of learning as a process of the transformation of the external social activity to the internal plane of a learner has considerable implications for research and educational practice to educate lifelong learners in 21st century.

Significance and Implications of Galperin's Legacy in 21st Century

Unit of analysis and methodological implications

Based on the ideas presented above, Galperin's theory offers an understanding of learning as a transformational process that happens in the specifically designed activities with material and social resources aimed at enhancing learning and developing students as learners. Students are central actors in this process and, by engaging in learning activities, students gradually develop (i) their understanding of the target concepts and (ii) how to learn.

The emphasis on students' participation in the specifically designed learning activities with material and social resources has methodological implications for educational research and shifts to focusing on the analysis of: (i) students' actions as active participants in the learning process and their interactions with the available resources and (ii) analysis of the design and structure of the learning activities. These premises imply the need to examine students' learning in its ontogenesis with the *unit of analysis* comprising *students' actions and their interactions with the available material and social resources* and *the design of the learning activities* engaged by students. Such an approach has been used in several studies (Engeness, 2018, 2020; Engeness & Edwards, 2017; Engeness & Mørch, 2016) to examine students' learning with digital technology. The implications of these findings for classroom pedagogy indicate the need (i) to introduce both material and social support resources and (ii) to carefully design learning activities to assist students' move from orientation to dialogical thinking.

Galperin's theory to understand learning to learn approach

The contributions of Galperin indicate that learning and development involve engaging in social experience and aim at initiating changes in the existing psychological functions by forming new relationships between these functions. Therefore, the development of the learner comprises quantitative and qualitative changes. *Quantitative changes* are characterised by the formation of new psychological functions, the acquisition of new skills and learners' ability to apply these skills in various contexts. *Qualitative changes* are characterised by modifying the structure of the psychological functions and establishing new relationships between these functions across contexts to enhance learners' capacity to be in control of their own learning.

The relationship between learning and development, in turn, was described in Vygotsky's zone of proximal development (ZPD)—as an ability of a child to perform tasks with assistance from a teacher or a more capable peer (Vygotsky, 1986, p. 198). For Vygotsky the quality of teachers' instructions and teacher-students' collaboration in the learning activity was crucial. This evokes an emphasis on the agency of the teacher and the learner in bringing about quantitative (e.g. acquisition of new skills) and qualitative changes (e.g. establishing the relationships between skills across contexts and practices to enhance the capacity to be in control of one's own learning) in the psychological functions of the learner. From the perspective of Galperin's legacy, *students' capacity to learn how to meaningfully engage in new types of learning activities constitutes learning to learn, which brings about qualitative changes in the psychological functions and the development of the learner*. Such a position evokes the need to design activities aimed at enhancing students' capacity in learning to learn. The third type of orientation (complete and constructed by learners following an approach suggested by the teacher), presented in detail above, might indicate how to design such learning activities. The benefits of the third type of orientation Galperin saw in the 'wholeness' of the approach to learning instead of studying various phenomena/concepts separately. This type of orientation offers a new way of storage of information: instead of memorising a great amount of separated facts and concepts, a unified method of systematisation is offered which

can be reused by learners in other activities. The third type of orientation offers a unified approach to learning and creating links between sciences and approaches to studying them. By applying the third type of orientation learners master the essence of learning through studying a phenomenon and a *learning activity* carries a new function: not as a studied object, but as *a tool for studying the essence of the learning*. In doing so, students develop their understanding about the nature of the activity of learning across contexts and subject areas and their agency in leaning to learn may be enhanced.

Galperin's theory on the agency of teachers and learners

Several authors have made attempts to define agency from a socio-cultural and cultural-historical perspectives. For example, Rajala and colleagues explain:

...agency for the opportunity, will and skill of people to act upon, influence as well as transform activities and circumstances in their lives. Agency is hence closely related to autonomy and power relations in human activity and learning" (Rajala, et al., 2016, p 1).

It is argued that:

...agency alludes to the capacity of humans to distance themselves from their immediate surroundings and it implies recognition of the possibility to intervene in, and transform the meaning of, situated activities" (Mäkitalo, 2016, p. 64).

By taking a perspective of transformative activist stance (TAS), Stetsenko (2017) defines agency as:

...a quality of activity by actors that is contingent on how this activity contributes to and makes a difference in the world of social practices" (Stetsenko, 2017, p. 225).

These definitions resonate with Edwards' (2015) conceptualising learners' agency as an ability to propel themselves forward while recognising and responding to the demands in tasks and with increasing competence, repositioning themselves within a knowledge domain (Edwards, 2015). As we have already indicated, Galperin's pedagogical theory, might offer a useful conceptualisation of *learners' agency as an ability to engage in the process of learning and advance in this process while mastering their understanding about the target concepts and about what learning makes*:

... to teach – means to develop the capacity with learners to analyse independently" (Lecture 1)

However, Galperin goes further by not only offering his understanding of learners' agency but discussing in detail *how* learners' agency may also be enhanced. In doing so, Galperin empowers teachers and offers an approach with significant pedagogical implications. He explains that learning activities designed with the orientation of the third type might foster the capacity in learning to learn and enhance learners' agency as independent lifelong learners. Therefore, teachers are encouraged to offer an approach to enhance learning and the development of students as learners: "... teachers have to find the system of conditions under which students cannot help mastering the action and, in doing so, learn how to complete other tasks" (Lecture 1).

By engaging in such activities students' agency as lifelong learners (Mäkitalo, 2016; Rajala et al., 2016) may be enhanced. As Stetsensko (2017) emphasises:

Agency is constituted by the activities we perform including the ones in which we anticipate and imagine the future- as parts of the larger process of positioning ourselves within the practices, that is, taking a stand on how one is positioned within social practices and, most critically, on these practices (p. 227)

To develop such agency is of primary significance in educating independently thinking lifelong learners. The phases of the development of mental actions, suggested by Galperin, indicate that learning is a dialectical process originated in learners' interactions with material and social resources that happens through transformations of various forms of activities learners engage in and, therefore, the transformations of learners themselves. By engaging in these transformations, learners reposition themselves in knowledge practices and in doing so, enhance their agency. Therefore, learners' agency is of a transformative nature. The emphasis on the development of students as independent agentic learners is central to the debate about contemporary challenges; essential to create learners' own development, their future and their world. In the following, we discuss several implications of Galperin's legacy for pedagogical practice.

Implications of Galperin's theory for sports coaching

The explicit conceptualisation of the role of the sports coach as educator by Jones (2006) over a decade ago, has led to increased traction of the pedagogical nature of coaching. To make sense of coaching practice and how to teach it; scholars have engaged with a broad range of pedagogical perspectives (Jones et al., 2018). The burgeoning work in this area has seen tentative steps taken using Vygotsky and Leontiev's work in coaching research (Jones et al., 2018; Jones et al., 2016). More specifically, a comprehensive case has been presented of how their principal ideas can aid our understanding of both the act and process of coaching, as well as a structure for practical and theoretical coaching improvement. As such, through consolidating and extending Vygotsky and Leontiev's work, Galperin's pedagogical framework, as presented in this article, has the potential to make a significant contribution to deconstructing and guiding future coaching practice.

Within sport coaching knowledge acquisition has continued to be the predominant model of learning (Jones et al., 2018). An individual's mind is viewed in this instance, as a container to be filled with certain materials; with learning seen as a permanent state of having (discovering) separated knowledge and skills (Sfard, 1998). However, the development of learners' conceptual understanding about what it means to engage in a team game appears to be underplayed. Here, the link with Galperin's first type of orientation is evident, where learning has a reproductive character directed at acquiring knowledge by trial and error (Engeness & Lund, 2018). Incomplete orientation activity echoes 'traditional' forms of coaching, for example in team games such as football, where the development of techniques occur in isolation, away from, or external to, a game context (De Souza & Mitchell, 2010). In a

typical football session using this approach, there is an explanation and demonstration of a technique such as passing to all players, with little if any emphasis placed on players' conceptual understanding how to tactically play the game. The players replicate the technique in isolated practices before attempting to implement it as a skill in a game situation. Unsurprisingly, this approach has had limited success in enabling the transfer of techniques from the training field into skills in games (Harvey et al., 2018). Viewed through a Galperin lens the movement from practice to theory (concrete to abstract) means that the orientation scheme of the game is incomplete, and the players do not develop their conceptual understanding of the game.

Although coaching using 'traditional' approaches continues on a regular basis, there has been a shift towards placing greater emphasis on developing learning within context (Renshaw et al., 2015). This, for example, has involved modifying practices in team games (e.g. player numbers, space, rules) focusing on designing exercises representative of the full game form. For instance, a constraint-led approach, underpinned by the theory of ecological dynamics, gives prominence to behaviour emerging through manipulation of constraints (Chow et al., 2013). The focus is on a coach assuming a more 'hands-off' role and being a facilitator during practices (Renshaw et al., 2016). Hence, the onus is on shaping exercises that allow the 'game be the teacher' with players implicitly learning the required skills within the context presented. Here the limitations, as highlighted by Galperin's first type of orientation are evident, with learning developed through trial and error while discounting the link to the essence of the phenomena (i.e. tactical understanding how to play the game) (Engeness & Lund, 2018).

As mentioned previously, cultural-historical scholars have highlighted the necessity for a more capable other (i.e. teacher/coach) to design practices that will assist the development and learning of participants (Vygotsky, 1978). In recent debates on 'athlete centred' philosophies, the importance of a coaches' influence on pedagogical interactions has been reiterated, arguing against approaches based solely on athletes driving their own learning (Jones et al., 2018; Denison et al., 2015). Similarly advocates of game-centred approaches (GCA), who value the combination of tactical understanding and skill development in team games, stress the importance making teaching explicit, purposeful and directed through structured exploration, to ensure knowledge development and learning (Harvey et al., 2018). The ability to foresee or infer consequences has been identified as a vital ingredient for coaches (Hemmetad et al., 2010), with the presence of sociality and related intentionality key factors in the process (Jones & Corsby, 2015). Therefore, how a coach interacts and explains ideas, values, strategies, and speech patterns, influences greatly what an athlete internalises and learns from (Jones & Ronglan, 2017; Jones & Thomas, 2015). Crucially in the context of this article, coaches can carefully construct ideas by 'seeing' the outer limits of athletes' ZPD; which the learner can only imitate initially but, with further time and assistance, develops into understanding and ultimate internalization (Jones et al., 2018).

Here, the potential value and importance of Galperin's theory for coaches is evident as it can shape interactions with athletes and transform learning through supporting the transformation of external social activities into internal activities. His pedagogical

theory provides a specific framework for coaches to structure collaborative solutions to team tactical problems (abstract), through the dialectical movement of the applying theoretical knowledge in practical situations (concrete). Using the development of tactical knowledge between teammates in basketball as an example (Vasiljev, 1971), the *second type of orientation* (complete and provided by a teacher) can provide an opportunity for a coach to identify essential features of their own game and plan what they want the players to produce in games. Identifying all the characteristics of the key moments in the game is crucial here (e.g. attacking in the final third) alongside providing detailed descriptions of the role of each player in these situations. A task involving a specific tactical problem can then be analysed by players from a certain perspective (i.e. role in a specific position on the field) in the form of *materialised action* using detailed objects (e.g. descriptions on the orienting card) provided by the coach. In this activity, placing importance on *communicated thinking*, players take it in turns to use the cards, to analyse and verbally explain to teammates their role in solving the tactical problem. This also involves completing the activity by talking, using objects such as a tactics board, video footage or even during the training session itself, which also creates collaborative understanding amongst the group of players. Having this 'visibility' of thought contributes to creating players' common understanding of the target situation and by engaging in collaborative analysis of the situation, plan further actions of players to engage in tactical interactions. Such an approach is termed by Galperin as creating a common orienting basis and it allows players to critically challenge others knowledge while also providing the coach with the opportunity to monitor and check individual's tactical understanding. As player learning progresses the activity moves from materialised to *dialogical thinking* whereby the player establishes communication of these thoughts with themselves (as another person), before finally becoming a pure mental act focusing on its outcome (*acting mentally*).

According to Galperin's extensive research, the advantage of the second type of orientation is that it provides the opportunity to enhance the learners (i.e. players) ability to develop their conceptual understanding of the target game, the role of tactical interactions and individual contributions of the players. In the example above, this produces greater individual awareness of their own and teammates' tactical performance, while also developing the ability to analyse and adapt movements, prior to, during practices and within competitive games. In doing so, players can potentially develop their understanding about the essence of the activity of learning across contexts and their agency in the leaning process. Therefore, the pedagogical framework could also be used to develop specific skills in team sports, as evidence of verbal understanding of tactics on its own is not enough, as the desired performance or knowledge has to be actively demonstrated (Jones & Thomas, 2015).

In theory, tactical understanding can also be developed using the third type of orientation. In this instance, the coach and players collaboratively construct the orienting cards, which are subsequently applied to solve tactical problems. A potential shortcoming of the third type of orientation is that it is time consuming, conflicting with a coach's main priority, which is to have players meaningfully engaging in playing the game as soon as possible. From a coaching perspective, therefore, there

is potentially less importance placed in developing players understanding about how to learn to play the game.

Implications of Galperin's theory for pedagogic design principles of classroom activities and digital environments

The importance of the learning to learn approach and the contemporary digital transformation shifts the emphasis to understanding how to design not only classroom activities, but also digital environments (for example, Massive Open Online Courses—MOOCs, learning management systems (LMS), various software and applications). Such a two-dimensional focus is of particular significance for teacher education and pedagogical practice aimed at preparing students for their future work. We suggest that Galperin's theory may offer an approach to design classroom activities and digital spaces aimed to enhance learning and their understanding of how to learn. From the perspective of Galperin's pedagogical theory, the following design principles (DP) of classroom activities and digital environments may be suggested.

DP1: When designing a classroom activity or digital environment, it is important to (i) identify the target concept students need to develop their understanding about and (ii) the essential characteristics or structural parts of the target concept. In addition, the sequence of presenting the essential characteristics of the target concept to learners should be identified based on students' prior knowledge and skills.

DP2: If a learning activity is to adequately assist the development of students' learning and their understanding of the learning process, it might be organised according to the third type of orientation: complete and created by students by using an offered approach.

DP3: The overview of the whole activity, termed by Galperin as 'operational scheme of thinking' might be integrated into classroom activities or digital environments to enhance students' understanding of the learning process they engage in.

DP4: The phase of materialised action indicates that some resources to assist the development of learners' conceptual understanding should be presented in the materialised form (digital resources, animations, etc.). Students' experience from interactions with the materialised resources is transferred through collaborative interactions to the internal plane of the learner (materialised action—communicated thinking—dialogical thinking—acting mentally).

DP5: The phase of communicated thinking, creates the premises for social interactions in digital environments (e.g. discussion forums, collaborative video meetings, etc.).

DP6: The role of feedback and teacher facilitating of the learning process need to be accounted for in the design: feedback provided to learners will assist students to develop their conceptual understanding and to enhance students' understanding about how to go about learning. It has been discussed that such feedback is particularly appreciated by the students in the phases of materialised action and communicated thinking (Engeness, 2018, 2020). In later forms of the learning process, e.g. dialogical thinking, feedback might be provided on request or with regards to how well learners master the activity they are engaged in.

In summary, these design principles are intended to: (i) enhance students' learning and (ii) by adopting the third type of orientation, develop students' understanding about how to go about learning. In doing so, students might foster their capacity in learning to learn and position themselves as active agents in knowledge practices. We acknowledge that there is still work to be done in making the arguments about the pedagogic potential of the presented here design principles, however, this discussion is timely and may offer teachers a powerful tool to respond to the demands in the contemporary education.

Critical reflections on benefits and limitations of Galperin's legacy

A theory is worthless if it cannot be adopted and used by practitioners. Theoretical knowledge can be used as a guidance or an orienting tool to inform practical decisions. To be able to do so, a theory should be understood by the practitioners to empower them to implement and operationalise the suggested theory in practice. We believe that Galperin's psychological theory, originally termed as "Planned Stage-by-Stage Mental Actions Formation" (PSMFA) (1968, 1989, 1992)¹ can be considered as an approach particularly useful for educational and other practitioners.

Galperin's legacy offers a perspective on various psychological processes that interplay to contribute to the development of mental actions and concepts with learners. Such a perspective comprises, on the one hand, a theoretical analysis of the human psychological functions and consciousness, and, on the other, a carefully elaborated and tested system of psychological conditions of intentional development of mental actions with the desired properties. However, Galperin's theory should not be understood as an algorithmic prescription that has to be followed in an attempt to achieve the desired outcome. Rather, it should be understood as theoretical guidance to be taken away, adopted and operationalised in specific learning situations characterised by several variables: the nature of the subject and target concepts, age and previous knowledge of the learners, and characteristics of the environment and others.

We have seen periods of great optimism with regard to the usefulness of Galperin's approach. Indeed, by implementing this approach in classrooms, it appears to be possible to radically transform traditional learning and teaching. Consequently, many objectives of effective schooling have been achieved and have been documented by hundreds of empirical studies. For instance: (1) the mastering of the curriculum by a majority of learners who possess the required level of prior knowledge and skills can be achieved without extending schooling time and at no additional cost; (2) the differentiation of the types of instructions teachers give to students with varied educational needs is minimized or disappears entirely; (3) learners are able to transfer knowledge and skills to new situations within and across subject areas; (4) by developing their understanding about what learning involves, students gain control over their learning and their motivation to learn may be enhanced (Galperin, 1989; Podolskij, 1993).

¹First publication of the approach appeared in Russian in 1952, followed by a comprehensive description of the approach in English—in 1968.

However, when comparing publications from the 50s–70s and 80s–90s (Podolskij, 2009, 2014) it is clear that there has been a significant decrease in optimism concerning the application of PSFMA. While there have been many interesting experiences in different parts of Russia and outside of it, which demonstrate successes and challenges in the application of PSFMA in educational practice; there is evidence that the implementation in classrooms has been rather limited.

There is a reason for the lack of sustained take up, and it is of a methodological nature in relation to Galperin's approach. The initial success of the approach and the enthusiasm it engendered led to a serious misunderstanding concerning the status of the approach. In brief, sometimes the approach has been interpreted not as a general description of principles and regularities, which attempt to explain the dynamics of the development of human mental activity, but rather as a set of techniques and instructions about how to teach. Such an interpretation can distort reality and transform the approach into a kind of "absolute" knowledge, a sort of so-called philosopher's stone.

It is evident that the direct application in classrooms of methods employed in research, has a number of fundamental limitations. Strong results cannot be observed in lessons when the conditions, which were consciously controlled in a psychological experiment, do not correspond to the conditions of the practical situation. The direct transfer of the mechanisms of the development of mental actions, gives satisfactory results only in those infrequent cases when the conditions of the experimental formation completely (or at least in a major part) correspond to the conditions of real learning in classrooms. Determining the correct balance between a theoretical scheme adopted purely for research purposes, a scheme that describes the general principles of the acquisition of new knowledge by a learner, on the one hand, and the real complexity of learning and teaching on the other hand is challenging. It is therefore crucial to understand the following: in order to bridge the gap between research methods and the practice of learning and teaching, it is necessary to carry out several adjustments that account for the complexity of learning. These requirements for the practical use of the method of systematic formation were described in numerous studies by the followers of Galperin (Podolskij, 1987, 1993, 1997, 2008).

Concluding Remarks

To summarise, by briefly introducing the central ideas of Galperin's conceptual contribution presented in this collection of *Lectures* on the development of human mental activity, we attempted to outline some implications of Galperin's pedagogical contribution for educational practice and research.

First, we argue that Galperin's theory explicates his profound understanding of the foundations of the cultural-historical theory and should be understood as an attempt to consolidate the contributions of Vygotsky and Leontiev, to extend and operationalise them in educational practice and in research.

Second, the emphasis on students' learning in the specifically designed learning activities urges the adoption of a *unit of analysis* comprising students' actions with material and social resources and the design of the learning activities students engage in.

Third, Galperin's theory offers a useful understanding of a *learning to learn* approach as a capacity of students to learn how to master new types of learning activities to bring about qualitative changes in the psychological functions and the development of learners. It is argued that the orientation of the third type (complete and constructed by learners following a suggested approach) may enhance the agentic capacity of students in learning to learn. By following such an approach, *a learning activity* carries a new function: *as a tool for studying the essence of the learning*.

Fourth, the emphasis on the learning to learn approach to develop students' understanding of the target concepts and the way how to go about learning, has implications to conceptualise *learners' agency* as *an ability to engage and advance in the process of learning while mastering their understanding about how to learn*.

Fifth, Galperin's theory has significant implications for pedagogical practice. In this article, we have briefly discussed how Galperin's legacy can contribute to deconstructing and reconstructing coaching practice. We argue that the second type of orientation may be useful to develop learners' (players) conceptual understanding of the target game, the role of tactical interactions and individual contributions of the players. Based on the premises of Galperin's theory, we have suggested the pedagogic design principles of classroom activities and digital environments aimed to enhance learning and the development of students as learners.

Finally, Galperin's theory should not be understood as an algorithmic prescription that has to be followed to achieve the desired outcome. Rather, it should be understood as theoretical guidance to be taken away, adopted and operationalised in educational practice. As indicated above, in the 21st century we live in times of rapid and complex climatic, demographic and technological transformations; that have tremendous effect on the way we live, work and learn. We have become central actors and participants in these transformations moving away from our roles in 20th century as spectators and consumers. Galperin's conceptual contribution may therefore have significant implications for the education of agentic citizens in contemporary society who possess the capacity to meaningfully respond to the challenges and transform the world where we live.

References

- Chow, J. Y., Davids, K., Button, C., & Renshaw, I. (2013). *Nonlinear pedagogy in skill acquisition: An introduction* (1st ed.). London: Routledge.
- Claxton, G. (2013). *What's the point of school? Rediscovering the heart of education*. Oxford: Oneworld Publications.
- Collins, A., & Halverson, R. (2018). *Rethinking education in the age of technology: The digital revolution and schooling in America*. New York: Teachers College Press.
- Denison, J., Mills, J. P., & Konoval, T. (2017). Sports' disciplinary legacy and the challenge of 'coaching differently'. *Sport, Education and Society*, 22(6), 772–783.
- De Souza, A., & Mitchell, S. (2010). TGfU as a coaching methodology. In J. Butler & L. Griffin (Eds.), *More teaching games for understanding: Moving globally* (pp. 187–208). Champaign, IL: Human Kinetics.
- Edwards, A. (2015). Designing tasks which engage learners with knowledge. In I. Thompson (Ed.), *Designing tasks in secondary education: Enhancing subject understanding and student engagement* (pp. 13–27). London: Routledge.
- Engeness, I. (2018). What teachers do: Facilitating the writing process with feedback from EssayCritic and collaborating peers. *Technology, Pedagogy and Education*, 27(3), 297–311.
- Engeness, I. (2020). Teacher facilitating of group learning in science with digital technology and insights into students' agency in learning to learn. *Research in Science & Technological Education*, 38(1), 42–62. <https://doi.org/10.1080/02635143.2019.1576604>.
- Engeness, I., & Edwards, A. (2017). The complexity of learning: Exploring the interplay of different mediational means in group learning with digital tools. *Scandinavian Journal of Educational Research*, 61(6), 650–667. <https://doi.org/10.1080/00313831.2016.1173093>.
- Engeness, I., & Lund, A. (2018). Learning for the future: Insights arising from the contributions of Piotr Galperin to the cultural-historical theory. *Learning, Culture and Social Interaction*. Epub ahead of print 6 December 2018. DOI: <https://doi.org/10.1016/j.lcsi.2018.11.004>.
- Engeness, I., & Mørch, A. (2016). Developing writing skills in english using content-specific computer-generated feedback with essaycritic. *Nordic journal of digital literacy*, 10(02), 118–135.
- Galperin, P. I. (1968). Towards research of the intellectual development of the child. *International Journal of Psychology*, 3(4), 257–271.
- Galperin, P. I. (1989). Organization of mental activity and effectiveness of learning. *Soviet Psychology*, 27(3), 65–82.
- Galperin, P. I. (1992). Stage by stage formation as a method of psychological investigation. *Journal of Russian and East European Psychology*, 30(4), 60–80.
- Harvey, S., Pill, S., & Almond, L. (2018). Old wine in new bottles: a response to claims that teaching games for understanding was not developed as a theoretically based pedagogical framework. *Physical Education and Sport Pedagogy*, 23(2), 166–180. <https://doi.org/10.1080/17408989.2017.1359526>.

- Hemmestad, L. B., Jones, R. L., & Standal, Ø. F. (2010). Phronetic social science: A means of better researching and analysing coaching? *Sport, Education and Society*, 15(4), 447–459.
- Jones, R. L. (Ed.). (2006). *The sports coach as educator: Re-conceptualising sports coaching*. London: Routledge.
- Jones, R. L., & Corsby, C. (2015). A case for coach Garfinkel; decision-making and what we already know. *Quest*, 64(4), 439–449.
- Jones, R. L., & Thomas, G. Ll. (2015). Coaching as 'scaffolded' practice: Further insights into sport pedagogy. *Sports Coaching Review*, 4(2), 65–79.
- Jones, R. L., Edwards, C., & Viotto Filho, I. A. T. (2016). Activity theory, complexity and sports coaching: An epistemology for a discipline. *Sport, Education and Society*, 21(2), 200–216.
- Jones, R. L., & Ronglan, L. T. (2018). What do coaches orchestrate? Unravelling the 'quiddity' of practice. *Sport, Education and Society*, 23(9), 905–915.
- Jones, R. L., Thomas, G. Ll., Nunes, R. L., & Viotto Filho, T. (2018). The importance of history, language, change and challenge: What Vygotsky can teach sports coaches. Motriz. *Journal of Physical Education*, 24(2), e1018166.
- Kaplan, A. M., & Haenlein, M. (2016). Higher education and the digital revolution: About MOOCs, SPOCs, social media, and the Cookie Monster. *Business Horizons*, 59(4), 441–450.
- Laurillard, D. (2002). Rethinking teaching for the knowledge society. *EDUCAUSE review*, 37, 16–27.
- Leontiev, A. (1978). *The development of the psyche*. Lisbon: Horizonte University.
- Leontiev, A., & Luria, A. (1999). The psychological ideas of L.S. Vygotskij. In P. Lloyd, & C. Fernyhough (Eds.) *Lev Vygotsky: Critical assessments* (pp. 56–89). London: Routledge.
- Mishra, S. (2020). Technology applications in education: Policy and prospects. In S. Mishra & S. Panda (Eds.), *Technology-enabled learning: Policy, pedagogy and practice* (pp. 19–31). Burnaby: Commonwealth of Learning.
- Mäkitalo, Å. (2016). On the notion of agency in studies of interaction and learning. *Learning, Culture and Social Interaction*, 10, 64–67.
- Podolskij, A. I. (1987). *Stanovlenie poznatel'nogo deistvii: Nauchnaia abstraktsiia i realnost [The development of cognitive action: Scientific abstraction and reality]*. Moscow: MGU.
- Podolskij, A. I. (1993). Psychological theory as base of instructional design and as part of curriculum in post graduate education. In C. Terlouw (Ed.), *Instructional development in higher education: theory and practice*. Amsterdam: Thesis Publishers.
- Podolskij, A. I. (1997). Instructional design for schooling: Developmental issues. In S. Dijkstra, et al. (Eds.), *Instructional design: International perspectives* (Vol. 2, pp. 289–314). Mahwah, NJ: Lawrence Erlbaum.
- Podolskij, A. I. (2008). Bridging the gap between psychology and instructional practice. In D. Ifenthaler, P. Pirnay-Dummer, & M. Spector (Eds.), *Understanding models for learning and instruction* (pp. 211–224). New York: Springer.
- Podolskiy, A. I. (2009). On scientific status and practical significance of one psychological theory. *Psychology in Russia: State of the Art*, 2, 187–209.
- Podolskiy, A. I. (2012). Development and learning. In N. Seel (Ed.), *International encyclopedia on sciences of learning* (pp. 944–950). New York: Springer.
- Podolskiy, A. I. (2014). There is nothing so practical as a good theory: How to let it work in practice (the case of Galperin's theory). *Psychology in Russia: State of the Art*, 7(3), 4–12.
- Rajala, A., Martin, J., & Kumpulainen, K. (2016). Agency and learning: Researching agency in educational interactions. *Learning, Culture and Social Interaction*, 10, 1–3.
- Renshaw, I., Araújo, D., Button, C., Chow, J. Y., Davids, K., & Moy, B. (2016). Why the constraints-led approach is not teaching games for understanding: A clarification. *Physical Education and Sport Pedagogy*, 21(5), 459–480. <https://doi.org/10.1080/17408989.2015.1095870>.
- Rogers, A. (2003). *What is the difference? A new critique of adult learning and teaching*. Leicester: NIACE.
- Sahlberg, P. (2010). Rethinking accountability in a knowledge society. *Journal of Educational Change*, 11(1), 45–61.

- Säljö, R. (1979). Learning about learning. *Higher Education*, 8(4), 443–451. <https://doi.org/10.1007/bf01680533>.
- Selwyn, N. (2016). *Education and technology: Key issues and debates*. Bloomsbury Publishing.
- Sfard, A. (1998). On two metaphors for learning and the dangers of choosing just one. *Educational Researcher*, 27, 4–13.
- Smith, K., Gamlem, S. M., Sandal, A. K., Engelsen, K. S., & Tong, K.-W. (2016). Educating for the future: A conceptual framework of responsive pedagogy. *Cogent Education*, 3(1), 1227021. <https://doi.org/10.1080/2331186X.2016.1227021>.
- Stetsenko, A. (2017). *The transformative mind: Expanding Vygotsky's approach to development and education*. Cambridge: Cambridge University Press.
- Vasiljev, Y. V. (1970). K psihologičeskoj karakteristike igrovih deistvij futbolistov, VNIIFK. *Nauchnye trudy*, 1, 181–182.
- Vygotsky, L. (1978). *Mind and society*. Cambridge, MA: MIT Press.
- Vygotsky, L. (1986). *Thought and language*. Cambridge, MA: MIT Press.
- Zepke, N. (2008). Futures thinking: Raising questions about education in the digital age. *Computers in New Zealand Schools*, 20(3), 4–12.

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