Full length article

Learning for the future: Insights arising from the contributions of Piotr Galperin to the cultural-historical theory

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A B S T R A C T

The contribution of Piotr Galperin (1902–1988) to cultural - historical theory and related approaches to pedagogy remains little known in the West and is often reduced to listing the phases of the formation of mental actions. In this paper, introducing this Special Issue centred on four of his lectures given in the period 1970s–80s to psychology and philosophy students at Moscow State University, we attempt to position his contribution in the context of those made by Vygotsky, Leontiev and Davydov. In doing so, we offer an insight into the richness of Galperin's legacy and show the continuity in the research of these cultural-historical scholars. We argue that the contribution of Galperin has particular importance for understanding learning and teaching as a process of the development of learners. In particular, Galperin has explicated the dialectical nature of the process and has conceptualised learning and teaching as a specific type of orienting activity. In taking this line, Galperin's approach offers significant implications for pedagogical practices aimed at educating learners for the 21st century. We argue that Galperin's legacy presents invaluable potential for educational research and practice as an analytic resource for understanding how both students and teachers engage in the processes of learning, teaching and development.

1. Introduction

In the West Piotr Galperin (1902–1988) is associated primarily with his explication of the phases of the formation of learners' mental actions. However, his contribution to scientific knowledge and specifically to pedagogy and psychology is much wider. His rich legacy includes his study of attention and linguistic consciousness, which offers an original approach to the classical problem of the relation of mind and brain and addresses the problem of the subject of psychology (Podolsky, 2017). His study of the relation between learning-teaching, termed in the Russian language as *obuchenie* (Lund, Bakken, & Engelien, 2017) and mental development presents a framework which is able to combine current concerns about acquisition of knowledge with the need to know how to go about learning. Therefore, his work offers an insight into the learning and teaching process that goes beyond acquisition of knowledge and skills and introduces an approach that unpacks the learning processes in detail and explains what it means to learn. In line with Vygotsky and Leontiev, Galperin conceptualises *obuchenie* as a type of psychological ideal activity that is initially formed on the external plane in the material form in the course of social activities and then transferred to and transformed into the internal, psychological form. Galperin's innovative contribution was in describing *how* this transformation happens. In this respect, Galperin specifies how adequately structured learning and teaching processes may lead to the development of higher mental functions previously indicated in the works of Vygotsky (1980). Galperin offers a way of implementing Vygotsky's ideas of developmental learning in classrooms, enabling teachers to enhance students' understanding of how to go about learning.

However, Galperin's contribution goes far beyond the practical operationalisation of Vygotskian thoughts; it extends the ideas of Vygotsky and, in doing so, identifies still under researched, but crucially important areas in psychology, pedagogy and educational

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practice. Such a contribution is of particular significance for the aims of contemporary pedagogical practice and educational research that aims at preparing students for their future and the uncertainties that go with it (Claxton, 2013; Smith, Gamlem, Sandal, Engelsen, & Tong, 2016). That means, as Claxton has explained, "helping all young people to acquire the knowledge, skills, dispositions, and values they need to thrive and contribute to society, in the face of the challenges and opportunities they will meet" (Claxton, 2013, p.1). From a more political perspective, Miliband similarly argued that one of the core functions of 21st century education is learning to learn in preparation for a lifetime of change and therefore pedagogy should at its best be about what teachers do that not only helps students to learn but strengthens their capacity to learn (Miliband, 2003). We believe that Galperin's legacy offers an innovative approach to conceptualising learning and teaching that encapsulates invaluable potential for educational research and practice in the 21st century.

Numerous reviews and discussions of Galperin's work have been published since his death in 1988 (Arievitch, 2003; Arievitch & Haenen, 2005; Arievitch & Stetsenko, 2000; Arievitch & van der Veer, 1995; Gindis, 1998; Haenen, 1996b, 2001; Rambusch, 2006; Stetsenko & Arievitch, 1997, 2002). In these studies, which have usefully made aspects of his work available in English, Galperin has been introduced as an educational psychologist who transformed Vygotsky's socio-historical approach into a "technology of instruction" (Arievitch & van der Veer, 1995). True, but not fair, says a psychologist from the Netherlands, Jacques Haenen: Galperin was not just a "technologist", he contributed to the further theoretical and experimental development of the Cultural-Historical Activity Theory (CHAT) and this theory could not be fully understood without his contribution (Haenen, 1996b). Gindis describes Haenen's book *Piotr Galperin: Psychologist in Vygotsky's Footsteps* as a very stimulating and challenging attempt at the re-construction of CHAT and the history of Russian psychology not otherwise available in the English language (Gindis, 1998).

Arievitch and Stetsenko point to the central issues of Galperin's theory: the origins of mind and the nature of development of cognitive processes (Arievitch & Stetsenko, 2000). They explain that Galperin approached these issues by studying the process of internalisation of cultural tools as a specifically human form of individual cognitive development. In this respect, Galperin's theory clearly continues the Vygotskian line of thinking. However, Galperin went much further in that he operationalised Vygotsky's concepts of cultural tools, mediation and internalisation by scrutinising the ways in which the specifically human, internal plane of mental activity is formed (Arievitch & Stetsenko, 2000; Arievitch & van der Veer, 1995; Haenen, 1996b; Van Geert, 1987). According to Haenen (2001), Galperin extended Vygotsky's notion of the zone of proximal development (ZPD) by including a teaching – learning (i.e. *obuchenie*) model of the formation of mental actions, which integrates the notions of mediation, activity and internalisation. In doing so, Galperin outlined the steps in the teaching – learning process, formulated a set of conditions for the development of mental actions and showed the teacher's role (Haenen, 2001). Rambusch emphasises that Galperin's approach provides substantial support for situated learning theories and should, thus, be considered a valuable complement to the theoretical framework of situated learning (Rambusch, 2006). Arievitch points out that Galperin's approach contains a unique core component: a conceptualisation of psychological aspects of human activity, distinct from its physiological, logical or sociological aspects (Arievitch, 2003).

The four lectures chosen for the special issue have been translated into English for the first time and they belong to the Study of the Formation of Human Mental Activity from Galperin's collection of the Lectures in Psychology (Galperin, 2002). The translation of these lectures was a challenging endeavour and it required particular efforts and several rounds of discussions of the authors in order to understand Galperian thought and to convey it in English without changing its original meaning. The original audience for these lectures were philosophy and psychology students at Moscow State University in 1970s–80s. According to Podolsky (2017), by the beginning of 1970s, Galperin had developed his understanding of the core concepts of his pedagogical theory and therefore, these lectures reflect his way of thinking and summarise Galperin's outstanding contribution to cultural-historical psychology. The lectures were recorded and transcribed by Podoloskij and his team and edited as Lectures in Psychology [Lekcii po psikhologii] (Galperin, 2002) which were published for the commemoration of the centenary of Galperin's birthday in 2002.The lectures presented in this special issue are in turn:

– Lecture 10. The Development of Mental Actions and the Orienting Basis of Actions;
– Lecture 11. The Phases of the Formation of Mental Actions;
– Lecture 12.The Conditions for the Development of the Properties of the Action. The Phases of the Development of the Action;
– Lecture 13. The Process of Internalisation. Theoretical and Practical Implications of the Study on the Phases of the Development of Mental Actions.

We believe that these four lectures represent the central concepts of Galperian theory and offer an operationalised design of leaning and teaching as an orienting activity.

Galperin's short biographical notes have been introduced previously (Arievitch, 2003; Arievitch & Haenen, 2005). A more detailed scientific biography of Galperin has been compiled and published recently based on the data from the archives of the Academic Council of Psychology, Moscow State University and the materials provided by Galperin's grandson, Y. Abramson to the Archive of the Institute of Psychology of the Russian Academy of Sciences (Stepanova, 2017). Born on 2nd October 1902 in Tambov, Russia, at a young age Galperin was fond of reading books on philosophy and psychology from his doctor father's library. In 1921–1926 Galperin completed his education as a doctor and psycho-neurologist in Kharkov. After his graduation in 1926, Galperin started to work as a hospital doctor treating drug-abuse and in 1928 he was offered a position in the Ukrainian Psycho-Neurological Institute which became the Ukrainian Psycho-Neurological Academy in 1932 (Stepanova, 2017). In the same year, the department of psychology was also founded in the Academy under the leadership of Leontiev. At that time, Galperin was the head of the research group, which studied the theoretical grounds of psychology; first he worked with Luria and then he joined Leontiev's group, which focused on the role of material, external activity in the formation of human mind. During World War II, Kharkov was occupied by the Germans and

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in 1941 the Psycho-Neurological Academy was evacuated to Tumen where Galperin worked as a neuro-surgeon. In 1943, Galperin moved to Moscow following Leontiev who had moved there at the beginning of 1943, and worked at Moscow State University until his death in 1988. For most of his professional career Galperin therefore worked with Leontiev. The direct continuity of the research undertaken by Vygotsky and Leontiev remains an actively debated issue between those who express doubts that they belong to the same school of thought (Kozulin, 1986; Van der Veer & Valsiner, 1991) and those who understand the contributions of Vygotsky and Leontiev as complementary parts of the cultural-historical school (Arievitch, 2003; Haenen, 1996a). In this paper, we hope to contribute to this discussion, but primarily to provide a particular insight into the contribution of Galperin to cultural-historical psychology and its implications for pedagogical practice. In an attempt to do so, we start with the historical note as a backdrop to the discussion that will follow.

2. Historical background

The professional career of Vygotsky started in the Moscow Institute of Psychology which was founded in 1912 by the Professor of Psychology Chelpanov and built with the private donations of Schukin, a merchant, or businessman in today's terms (Zinchenko, 2013). Chelpanov's understandings of psychology was rooted in his philosophical views on the origins of mind and conscience, which contradicted the then fashionable approaches of reflexology initiated by the work of Bekhterev and Pavlov. Following this fashionable trend, in 1923, a student of Chelpanov, Kornilov wrote a report to the authorities in which he accused his teacher of idealism and criticised his view of psychology as a science that studies human souls. Chelpanov had to retire and Kornilov became the head of the Institute. In the same year (1923) Luria joined the Institute where he met Leontiev who was a student of Chelpanov. Luria subsequently became Leontiev's supervisor for a study of affect reactions. From that time and until the end of their lives, Leontiev and Luria worked closely together. In 1925, Kornilov, after a recommendation from Luria, invited Vygotsky to join the Institute. Luria had heard Vygotsky speaking at the Second Psycho-neurological Congress in Leningrad in 1924 on "The Methodology of Reflexological and Psychological Studies" (Kozulin, 1986). The invitation was accepted and Vygotsky joined the Moscow Institute of Psychology in 1925 as a "staff scientist, second class" (Van der Veer & Valsiner, 1991; Wertsch, 1988). Shortly after that, Vygotsky followed by Leontiev, continued the criticism of idealism of Chelpanov and this opened fruitful opportunities for Vygotsky and Leontiev to take leading positions in the development of new Soviet paedology (a science that combined pedagogy and psychology). However, both Vygotsky and paedology were soon to fall foul of Joseph Stalin. There were different reasons why Stalin chose paedology as a target for one of his purges (Gindis 1998; Van der Veer & Valsiner, 1991). However, at the end of 1920s the ideological atmosphere in Moscow became unbearable and even life threatening: there were attacks on Vygotsky and some of the works of Luria were banned. Only a few years later, in 1937, a book authored by Rudneva came out under the "telling title" *On Paedological Perversions of Lev Vygotsky*. Although he had died three years earlier, Vygotsky nevertheless had become a target of criticism that aimed at erasing his legacy. At the beginning of the 1930s it became very obvious that Vygotsky's and his colleagues' presence in Moscow was unwanted and in 1932 Leontiev, Luria, Lebedinsky, Bozjovich and others moved to Kharkov, the capital of Ukraine at that time, where they met Galperin who was working in the Ukrainian Psycho-Neurological Academy and who was involved in extensive research and teaching activity. Galperin's acquaintance with Vygotsky occurred during the latter's visits to Kharkov. Additionally the ideas of "late Vygotsky", analysed by Leontiev at the end of 1930s (Leontiev, 2005) greatly influenced Galperin's further work (Zinchenko, 2013).

There are various views on why Vygotsky did not move to Kharkov, despite the fact that in 1931 he was appointed as a Head of the Department of Genetic Psychology at the Kharkov State Institute of Professional Development of the Ministry of Health (Zinchenko, 2013). There could have been several reasons for Vygotsky's rejection of this offer and his acceptance of the offer that also came in 1931 from Rubinshtein to take up a position at the Department of Psychology at the Leningrad Institute of Pedagogy. However, contemporaries witnessed that Vygotsky came to Kharkov quite often and stayed in close contact with the Kharkov group for the rest of his life (Zinchenko, 2013). To pursue our aim of positioning the contribution of Galperin to cultural-historical theory, we will next elaborate on the research pursued by Vygotsky, Leontiev, Galperin and Davydov and outline all too briefly the contributions made by these seminal scholars to cultural-historical psychology and associated pedagogy.

3. The development of cultural-historical conceptual foundations: contributions of Vygotsky, Leontiev, Galperin and Davydov

3.1. The contribution of lev Vygotsky to cultural-historical theory

Vygotsky's analyses (1980, 1986) represented the first comprehensive and principled methods for a social, historical approach to understanding the development of human mind (Leontiev, 2005). His non-dualist approach to mind and society argued that higher mental functioning (an ability to think in abstract terms) is rooted in social life (Wertsch, 1991). Consequently, in order to understand cognition, one should turn to real life, which is stimulated by the development of the relationships among humans involved in practical activities (Vygotsky, 1980). Vygotsky also argued that participation in social practical activity, using tools, was the main factor influencing the development of the human mind.

Vygotsky's focus was on the role of tools, both material and conceptual, as the meditational means connecting a person and society. His argument was that tool mediation during practical activity regulates the changes in human mind and these tools acquire special meanings when put to use in human activity. Hence, external tools come to be internalised as signs. The tools used in the practical activity are externally directed and bring about changes in the surrounding environment, whereas the tools transformed into signs are internally directed and lead to changes in the human mind (Vygotsky, 1986).

In Vygotskian thought, the tools-signs relationship, by mediating psychological processes causes changes in the structure of these processes, and the development of new relationships between them.

> The sign as a tool reorganises the whole structure of psychological functions. It forms a structural centre, which determines the composition of the functions and the relative importance of each separate process. The inclusion in any process of a sign remodels the whole structure of psychological operations. (Vygotsky, 1997, p. 421)

Through his conceptual work on tool-sign, Vygotsky offered insights with considerable pedagogical implications. His argument was that such a principled approach to the analysis of human psyche showed a way of considering human cognition as a dynamic, dialectically developing system rather than a sum of unchangeable psychological processes.

> Higher mental functions are not built up as a second story over elementary processes, but are new psychological systems that include merging of elementary functions that will be included in the new system, and themselves begin to act according to new laws; each higher mental function is, thus, a unit of a higher order determined basically by a unique combination of a series of more elementary functions in the new whole (Vygotsky, 1997, p. 43).

The movement from social life to mind, which has implications for teaching, is encapsulated in his central thesis that mediating tools first appear as external and material, employed in the collective activity and gradually become internal, psychological tools used for managing one's own behaviour and psyche (Daniels, 2001).

The dialectical underpinning of this explanation of mediation is made explicit in his argument that tools themselves undergo changes in the course of practical activity: initially they are present in an external, material form, later on they get internalised and transformed to the inner, ideal form. This line of reasoning is very much present in Galperin's framework. A defining property of higher mental functioning is the fact that it is mediated by tools and sign systems such as natural language (Wertsch, 1991). This argument suggests that language, as the main system of signs mediating human psychological activity, also repeats the pathway of internalisation: from being used externally for communication with others and then individually in the form of inner speech (Vygotsky, 1986). The argument continues that speech has evolved as a particular form of human social relationships, which originated in practical work. Vygotsky concludes that the human mind does not develop in the practical work itself, but in the new social relationships that arise in the course of the practical activity (speech) and the products of human culture (language). Such a developmental process reflects the cultural-historical origin of human mind (Leontiev & Luria, 1999).

Although Vygotsky's theory embraced the human mind as a whole, Vygotsky was primarily interested in the development of language in its relation to thought (Kozulin, 1986). Language plays a double role in Vygotsky's psychological system: on the one hand, it is a psychological tool that helps to form other mental functions; on the other hand, it is one of these functions that also undergoes cultural development. In Vygotskian understanding, the process of the development of mediated forms of cognition was the process of the development of meanings; where meanings were encapsulated in words. Hence, it was important to trace the process of a word acquiring its meaning. Vygotsky, however, did not make any distinction between meanings and concepts, potentially because both could be expressed with the same Russian word *'ponyatie'*. English translations indicate that Vygotsky studied the development of concepts as a reflection of the process of the formation of higher mental functions. It was claimed that the level of the development of concepts with humans had a direct link with the human ability to reflect the surrounding environment and identify possible practical interactions with it.

In analysing conceptual development, Vygotsky introduced the categories of spontaneous and scientific concepts. The categorisation was based on the way learners made sense: a child makes sense of spontaneous concepts during everyday practical activities with an adult in a non-systematic way, usually by trial and error. In this way, a child is unable to separate essential from unessential features of concepts. In school, on the contrary, a child finds the conditions where systematic learning of concepts, for example definitions, is highlighted by the teacher introducing essential features of key concepts in lessons. Vygotsky considered that understanding of the concepts' essential features makes learning in school different from everyday learning. The benefits of such a 'top-down' method of learning Vygotsky saw in a growing ability of a child to operate with the concepts and apply them in various contexts.

To summarise, Vygotsky suggested that: i) the source of the development of human mind lies on the external plane, and the higher mental functions form during practical social activities with an adult or a more capable peer; ii) tools (material and linguistic) that mediate this activity are initially directed outwards, connecting the learner with the surrounding world and, by acquiring a particular meaning, transform into signs directed inwards, to the mental plane of the learner, iii) mediated meanings are transferred to the internal plane of the learner and can cause changes in the existing psychological functions and create new relationships between these functions. However, Vygotsky never operationalised such processes in detail. It remained for Galperin to take on such a challenging endeavour.

3.2. The contribution of Aleksei Leontiev to cultural-historical theory

While Vygotsky was very clear about the primary role of a practical activity in the development of human mind, he focused on the investigation of the role of tools, while the role of the activity that employed these tools appeared to be downplayed. 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. In his foreword to *Lev Vygotsky: Critical Assessments*, Leontiev wrote:

> Even if Vygotsky did not arrive in his own works at a consistent materialist understanding of mental processes as the product of

the development of complex forms of human activity (this position was developed later in the Soviet psychology), the significance of the propositions outlined above for how to move beyond ideas about invariant "mental functions" are extremely important. (Leontiev, 1999, p.11)

Having acknowledged the significance of the foundations laid by Vygotsky, Leontiev suggested that neither concepts and meanings, nor tools and signs on their own, but real life, determined the development of human mind as a whole and its separate psychological functions (Leontiev, 1978). Consequently, he identified the activity connecting an individual with the surrounding environment as a subject of psychology (Leontiev, 1978). Attention was directed to examining the structure of the activity with the purpose and the motive as crucially important. The notions of *action*, *activity* and *operations* were introduced, where an *action* was explained as an active attitude of the subject to the reality characterised by the concurrence of the motive and the purpose: the action of a subject was caused by the purpose and was directed to achieve it (Leontiev, 1978). An *activity* was defined as initiated by a shared or collective motive realised in the course of this activity. *Operations*, according to Leontiev, were the means of realisation of the activity, not fully adequate to the purpose or the motive, but to coping with the conditions in which the activity was carried out. In addition, Leontiev introduced the notion of the *personal meaning* of an action or activity which he understood as relationships between the motive and the purpose (Leontiev, 1978). Leontiev paid particular attention to the division of labour among several participants as a motor driving the action forward. He emphasised that collaborative activity caused the development of new types of psychological functions that reflected the relationships between an individual, other participants and the surrounding world. In these conditions, tools acquired a particular meaning as accumulating and encapsulating the public experience expressed in the language.

In brief, Leontiev suggested that learning happens in the process of transformation of the external practical social activity of humans into the internal, ideal activity. However, even on the ideal internal plane the activity retains its structure and is directed to solving tasks emerging from the person's interaction with the surrounding environment. In this way, the human mind is not seen as something opposite to the external activity, but as originated in and transformed from the external activity. Such an approach allowed Leontiev to argue that human cognition and external activity are closely linked; 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 the human mind.

With these arguments Leontiev formulated the principles that determined the further development of cultural-historical psychology: i) an activity approach to the subject of psychology; ii) the social nature of human psychological activity and iii) the unity of the external practical and the internal human psychological activity in learning and development. However, Leontiev focused more on the origin of the activity, object orientation and the collective motive. It remained for Galperin to conceptualise the link between the substance of the activity and the development of the learners who engage in this activity.

3.3. The contribution of Piotr Galperin to cultural-historical theory

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. An answer to this question was given by Galperin, who connected the developments made by Leontiev with the ideas of Vygotsky.

Galperin's contribution, which was developed and tested in more than 20 years of detailed work in school with teachers and students, centred on the question: *how* the mental, psychological (Vygotsky's legacy) emerges out of the "material", non-psychological (Leontiev's legacy). His approach was based on three premises: (i) the leading role of teaching and learning in development; (ii) conceptual development involves material (physical objects) or materialised actions (using models, simulations, animations, schemes, etc.); and (iii) a recognition of the centrality of cultural tools and social interaction in human development.

Galperin suggested that a learning activity is comprised of orienting, executive and control features. These different parts of a learning activity were developed in detail in his work, to create a complex system aiming at representing processes of teaching and learning in formal educational settings. Fig. 1 presents Galperin's complex conceptualisation of the orienting and the executive parts of a learning activity. In order to read the diagramme one needs to understand that the orienting part, with the detailed planning of the activity, precedes the executive part. The control part is not presented in the diagram.

Fig. 1 is one instantiation of a model that changed several times and never reached a final version. Also, this level of detail has given rise to misconceptions of Galperin's framework as being rigid, instrumental, and locked in a stepwise model. However, as Haenen, Schrijnemakers, and Stufkens (2003) show, Galperin's framework is flexible and far from amounting to a straightjacket. In what follows, we refer to the framework as modeled in Fig. 1 in order to maintain consistency in flexibility.

Galperin indicated that the orienting part of the action carries a particular significance:

…important aspects of the formation of individual actions, the success of their application and generally their significance in the life of an individual depends on the quality of the orienting part of the action (Galperin, 2002, Lecture 10, p.1).

The orienting part is discussed in detail in Lectures 10–13 presented in this Special Issue. In the **orienting** part, Galperin combined two subsystems (see Fig. 1): A) motivational and B) operational (which were separate in Leontiev's work). The operational subsystem consisted of four components: 1) building an image of the present situation; 2) revealing the potential of the individual components of the present situation for the learners; 3) planning the learning activity; and 4) further facilitation of the activity in the course of its execution. The **executive** part, in turn, involved three subsystems (see Fig. 1): C) the conditions for constructing of the activity; D) possibilities for the acquisition of the desired properties of the activity and F) the transfer of the original external activity to the ideal
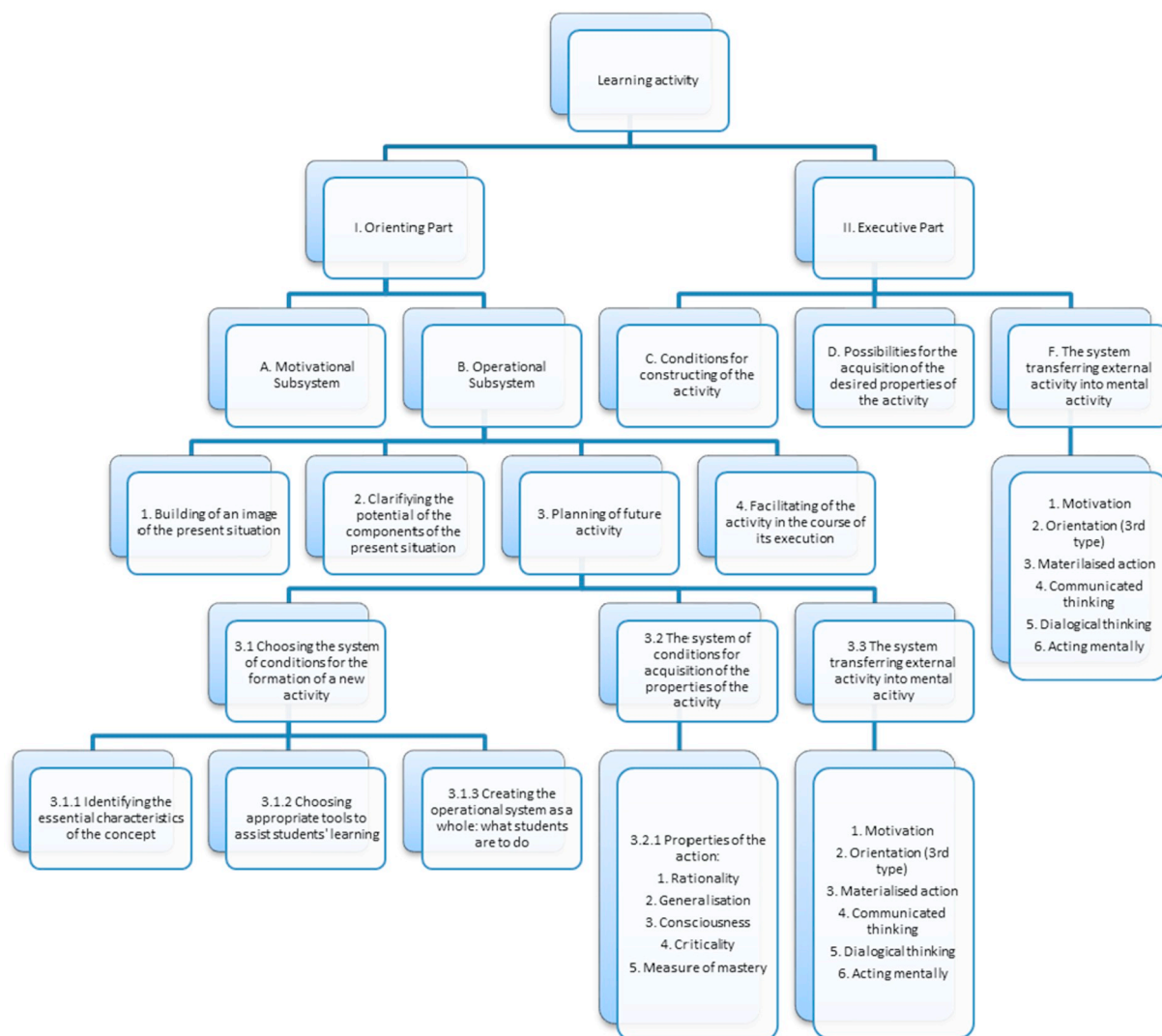
Fig. 1. P. Galperin's conceptualisation of a learning activity (Based on Lectures in Psychology, Moscow, Higher School, 2002).

plane of the learner, transforming the activity into a new psychological function. Galperin envisioned the ***control*** part (not shown in Fig. 1) as the developing of learners' attention and their ability to analyse and reflect on their own learning and suggest ways of further improvement. In summary, Galperin's analytic framing conceptualised in great detail learning activities which aimed at facilitating the development of new psychological functions in learners, working from external activities with material or materialised tools.

In line with Vygotsky and Leontiev, Galperin's learning and teaching methodology, which arose from the detailed breakdown of orienting, executive and control function, aimed at identifying the essential characteristics of a concept to be learnt. However, Galperin went further by showing the necessity for creating activities specifically aimed to reveal the essential characteristics of concepts for learners. Following Vygotsky and Leontiev, he believed that new types of psychological activity were initially formed on the external plane in material form in the course of social activities and were then transferred to the internal, psychological form. Galperin's contribution was in describing *how* this transformation happens by offering the system of interdependent characteristics just outlined.

The orienting, executive and control functions of learning and teaching activity were the foundation of the dialectically developing phases or forms (Galperin, 1969) of the transformation of external activity with material or materialised objects into internal psychological activity. Such transformation requires that individual features acquire meaning and value only when taken together, as an inseparable collective unity (Hegel, 1995). The dialectical link implies that each previous form of activity gives rise to and is gradually transformed into the next form. In the course of this transformation, external objects or tools are substituted by their images and concepts and the practical operations are replaced with mental theoretical operations.

Having conducted extensive research in schools, Galperin (2002) concluded that the approach suggested by this analysis allowed

the development of conceptual understanding with much younger learners (5–6 years old) and with a significantly higher proportion of high achieving students than had been suggested by Vygotsky. Moreover, the learning process happened faster, was easier and excluded memorising. The learners formed their understanding of all the essential characteristics of the concepts simultaneously and were able to use these concepts in various contexts. Galperin also saw the benefits of such an approach in assisting educators' efforts at externalising, unravelling and explicating the learning process for students, which he believed was "left behind the brackets" (Arievitch & Stetsenko, 2000, p.71) and therefore remained invisible for learners and teachers in the approaches suggested by Vygotsky and Leontiev.

In an attempt to conceptualise what constitutes developmental change, Galperin operationalised the ideas of Vygotsky and Leontiev to examine *how* actions are transformed from material to mental forms in the course of specifically designed learning activities employing cultural tools. Indeed, it has been argued that Galperin's perspective, by revealing the content of the processes that link leaning and development, adds an important insight into what constitutes developmental change (Arievitch & Stetsenko, 2000). In revealing this link, he offered an innovative analysis of instructional practices based on different types of cultural tools and he outlined the developmental potential of different kinds of instruction (Stetsenko & Arievitch, 2002).

In summary, Galperin's contribution was in: i) specifying the unique character of human mental development emerging in social activities and cultural, tool-mediated, practices; ii) conceptualising the nature and functions of human psychological processes as specific forms of activity, by outlining its structure and identifying the subject of psychology in studying of object-oriented activity in its ontogenesis; and iii) identifying the role and the function of tools as imbued with relevant social experience and mediating learning activity.

In doing so, Galperin made an attempt to consolidate the contributions of Vygotsky and Leontiev and extend these contributions by operationalising them and showing how they could be implemented in educational practice to promote learning and development. The ideas of Galperin were taken forward by his colleagues and students, particularly Vasilij Davydov who outlined the principles of the *developmental learning* and implemented them in educational practice.

3.4. The operationalised principles of developmental learning

The contributions of Vygotsky, Leontiev and Galperin were operationalised in the concept of *developmental learning* introduced by Davydov (2008, 2004) and Elkonin (1989) and were implemented in educational practice in the former Soviet Union in the 1970s and -80s. These principles were elaborated explicitly by Davydov whose extensive research revealed that traditional education did not ensure the development of students as learners, but only trained and reinforced those mental functions that were already developed in pre-school children: sensory observation, empirical thinking and utilitarian memory. Davydov suggested reorganising learning processes so that that they focused not on studying separate concepts and phenomena, but at examining relationships between them. Based on this principle, learning activities are transformed from having a *reproductive* character directed at acquiring knowledge and skills to being *productive*, characterised by learners' active engagement in analysis, synthesis, compare and contrast, classification, analogy and generalising. Including these forms of activities in, particularly, mathematics curricula was, according to Davydov, central to implementing developmental learning in schools. His guiding principle was *theoretical thinking:* a process of taking the learner *from the abstract to the concrete*. The process of theoretical thinking from the abstract to the concrete can be described as follows: students with the help of teachers analyse the content of educational material, identify the essential characteristics and relationships within and across the target concepts/phenomena, present these characteristics and relationships in a symbolic form and, in doing so, learners develop an abstract generalised understanding of the material being studied. When solving specific problems, learners identify and analyse links between the created representation of the essential characteristics/relationships and the specific case or problem and, in this way, they attempt to generalise the material they are studying. Such an approach, according to Davydov, creates informative generalisation of the relationships within and across concepts, followed by a reconstruction of this system by learners themselves, based on the characteristics they identify and the relationships between the concepts. Developmental learning through theoretical thinking allowed Davydov to formulate the principles of *didactics of learning and teaching* rooted in cultural-historical psychology. Among other essentials of didactics, such as continuity and conscientiousness in learning and teaching and the accessibility of knowledge, Davydov particularly focused on the principle of visualisation, which aimed at developing abstract thinking in learners by presenting the target concept in symbolic form as a model.

4. Learning for the future

4.1. Learning and development

The contributions of these cultural-historical scholars 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 accumulative formation of new psychological functions, i.e. the acquisition of new knowledge and skills and learners' ability to apply knowledge and 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 ZPD – as an ability of a child to perform tasks with assistance from a teacher or a more capable peer (Vygotsky, 1986). For Vygotsky the quality of teachers' instructions and

teacher-students' collaboration in the learning activity was crucial. There is therefore an emphasis on the agency of the teacher and the learner in bringing about quantitative (e.g. acquisition of new knowledge and 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. Students' capacity to learn how to master new types of learning activities constitutes *learning to learn*, which brings about qualitative changes in the psychological functions and the development of the learner. This analysis has pedagogical implications for creating activities aimed at enhancing students' capacity in learning to learn. Galperin suggested such an approach to creating activities by introducing three types of orientation.

4.2. Learning as an orienting activity

The classroom research conducted by Galperin and his collaborators identified that the orientating part was of particular significance in any learning activity. As mentioned above, the orienting part consists of motivational and operational subsystems which comprise: 1) building an image of the present situation; 2) clarifying the potential of the individual components of the present situation for the learners; 3) planning the learning activity; and 4) further facilitation of the activity in the course of its execution (see Fig. 1). Planning the learning activity involves identifying the following aspects: 1) the outcome of the action with its particular characteristics (e.g. what concept are the students to learn?); 2) the units/parts of the outcome of the action and the order in which they will have to be developed with learners (e.g. what are the essential characteristics of the target concept and in which order should these characteristics be developed with learners?), 3) tools that are available for the students and 4) the overview of the whole activity – the scheme of action as a whole termed as an *operational scheme of thinking* (e.g. how will students engage in learning?) Galperin indicated that the operational scheme of thinking is specifically necessary for human learners as it enhances understanding of the process of learning students engage in. The operational scheme of thinking makes learning completely different from purely mechanistic following the prescribed instructions and therefore may enhance learners' understanding of what learning makes.

In the orienting part, Galperin describes in detail the properties of the action learners will engage in: 1) rationality (identifying the action's objective and significant relationships that are essential to perform the action), 2) generalisation (an ability of the learner to identify the significant conditions for the particular action among the variety of conditions in which he operates), 3) consciousness of an action (an ability of the learner to give a verbal report of the action), 4) criticality (is a comparison or verification of the defined criteria for an assessment of the action in relation to reality) and 5) the measure of the mastery of the action (it is characterised, above all, by whether the action can only be performed by the learner using the initial material resources, or whether it can also be performed verbally, or in a symbolic form, or whether it can be performed mentally and how fast it can be performed.)

The orienting part urges careful planning of the type of orientation learners are going to be exposed to in the executive part of the learning activity. Galperin argues that orientation can be specific for a particular task or it can be used in several situations, comprising the essential characteristics of a concept or several concepts belonging to the same class. In addition, the orientation can be either provided for the learner in its final form ready to be used in a learning activity or it can be constructed by learners. The construction of the orientation by learners, in turn, can happen either by their trial and error or by following an approach offered by the teacher.

Based on these premises, Galperin identified three types of 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 very slowly with many mistakes and the activity of learning is extremely sensitive to the slightest changes in conditions; (ii) complete, where learners are told by the teacher about all the essential features 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 an approach offered by the teacher, which is aimed at identifying the essential features of the target concept. By using an approach offered to the learners by the teacher, a specific orientation can be constructed by learners, which is suited to the particular case. With the third type of orientation (complete but being constructed by learners following an approach offered by the teacher), learning happens quickly, with minimum mistakes and the skills formed in the course of this activity are transferrable to other learning situations (Galperin, 2002, Lecture 12; Engeness, 2018; Haenen, 2001).

The similarity between the first type of orientation (incomplete) and the third type (complete but being constructed by learners following an offered approach), is that in both cases the essential characteristics of the concept are identified by learners. However, the ways these characteristics are being identified differ: in the first type by 'trial and error' and in the third type by an approach given to the learners. Galperin saw the benefits of the third type of orientation in terms of the 'wholeness' of the approach to learning as an important alternative to studying various phenomena/concepts separately. This type of orientation offers a new way of storing 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. Galperin emphasised that the second type of orientation (complete and provided to learners) develops empirical thinking 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 and how to go about it*. 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 recognition that orientation of the third type may enhance learners' agentic capacity as confident and effective learners may

have implications for pedagogical practice aiming to bring about changes in the psychological functions of learners and enhance their capacity to learn.

4.3. The dialectics of learning and teaching

The orienting aspect 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 is described by the measure of its acquisition by learners engaged in the activity i.e. when transferred from the social external plane to the internal plane. The transformation of the learning activity from the social external to the internal plane is discussed at length in Lectures 11–13.

During 20 years of school research, Galperin outlined the dialectically developing forms this transformation may go through: (i) motivation, (ii) orientation, (iii) materialised action, (iv) communicated thinking, (v) dialogical thinking, and (vi) acting mentally[1] (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 were presented in detail in the previous section. 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. 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 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 him/herself (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 the 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.

These forms of the transformation of the external social activity to the internal plane of a learner may be used as analytic resources in the research to understand the learning processes underway in classrooms and other educational spaces where learners are supported by both material and social resources. In the final article of this Special Issue, we return to issues pertaining to transformation and agency and link them to current concerns in education.

5. Implications for educational research and practice

Galperin's contribution has several implications for educational practice and research. *First*, Galperin suggested that traditional approaches to teaching and learning remain invisible for both learners, teachers and researchers. However, to teach in the 21st century- means to develop the capacity with learners to analyse how to approach learning independently (Claxton, 2013; Smith et al., 2016; Miliband, 2003). According to Galperin, the structure of the learning activities may enhance capacities on the part of the learners. Therefore, there is a need for a system of conditions, under which students cannot avoid mastering the action. In doing so, the students learn how to complete other tasks. This system of conditions is described as the orienting basis of an action and the third type of orientation (complete and constructed by learners following an offered approach) may indicate a way of learning that facilitates not only conceptual understanding of the curriculum, but it may also contribute to the development of learners' understanding of an approach to learning across contexts and subject domains.

By adopting such an approach, learning activity is aimed at bringing about (i) acquisition of new conceptual knowledge and ways of working in a subject area; and (ii) the development of students' understanding of the nature of learning, and enhancing their agentic capacity in learning to learn. In this respect *learning activity* with the third type of orientation has the potential to not only achieve learning outcomes, but it acquires also a functional significance, becoming *a tool* in the learning process aimed at the development of students' understanding of an approach to learning. As mentioned earlier, the development can be found when there are qualitative changes in a person's orientation and actions across different practices. Galperin's conceptual contribution calls for longitudinal studies examining students' learning with the third type of orientation within and across curricula, to examine the development of students' understanding of the nature of learning in formal settings in different subject domains and enhancing their agentic capacity to be in control of their own learning. In brief, his approach aims at enhancing students' agentic capacity to take control over their own learning and become life-long learners.

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[1] The terms materialised action, communicated thinking, dialogical thinking and acting mentally have never been used by Galperin, however, these terms have been introduced in several studies (e.g. Arievitch & Haenen, 2005; Haenen, 2001; Rambusch, 2006).

Second, the dialectical underpinnings of the learning process indicate the importance of introducing material and social resources to assist students' move from orientation to dialogical thinking. In the teaching and learning process, material and materialised objects that encapsulate the key features of the target concepts, dialectically interplay with social support resources (teachers and collaborating peers) and students' learning is gradually transferred from a "lower material level" (Galperin's terms) to a "higher level" of social engagement (communicative and dialogical thinking) and finally to individual mental action. Students' engagement in these different forms of activity in the learning process may have implications for the design of learning activities to support the development of learners' conceptual understanding and mastery of the activity of learning as a dialectical process. Learning aimed at developing understandings of the key features of a target concept through engaging in different types of activities with material and social resources may therefore lay foundations to an approach to learning that can be applied across contexts and subject areas. Such an approach may empower learners to develop their understandings about what learning makes and enhance their agentic control over own learning.

Third, Galperin's pedagogical forms of the learning activity might be useful for educational research as an analytic resource to examine the process of learning and teaching. Galperin's dialectically linked pedagogical phases might be a helpful addition to both qualitative and quantitative methodologies to understand what students do at different times as they progress in their learning and how teachers facilitate students' learning process (Engeness, 2018; Engeness & Edwards, 2017). This approach may therefore offer new ways to use Galperin's conceptual contribution in further research examining teaching and learning processes and the design of learning resources and activities.

Finally, Galperin's pedagogical contribution highlights that teaching and learning is a developmental process of becoming life-long learners involving both learners and teachers as designers and active participants in the learning process. Learning and teaching is a process of the dialectical development of its participants through the activities they are involved in. Therefore, the structure of the learning activities and the mediating resources they employ are crucial for the development of students as learners. Such an approach offers implications, for example, for the education of teachers and the formation of their identity through involvement in collaborative transformative practice, carried out through unique individual contributions to this practice, to be the constitutive ontological grounding for human development. In this respect, teacher and learner identity is conceptualised as constructed via meaningful life agendas oriented toward pursuits of *changing* something in and about social practices (Stetsenko, 2009).

For Galperin education is not about acquiring knowledge for the sake of knowing, but as an active project of becoming human through one's own activist pursuits. As Stetsenko (2009) points out, Galperin's view conceptualises the unity of knowing, being/becoming, and doing, as well as the unity of learning and identity – all merged on the grounds of viewing individuals collaboratively contributing to and changing their community practices as the core grounding for human development. In doing so, Galperin's approach contributes to providing a more comprehensive insight into learning and development of learners in the 21st century.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.lcsi.2018.11.004.

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