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E-TEXTBOOKS AND NEW TECHNOLOGIES. OPPORTUNITIES AND OPENINGS FOR A REFLECTIVE TEACHER

New technologies and their applications in contemporary education increasingly accentuate their presence. E-textbooks and e-learning are no longer considered as new developments. The use of digital didactic tools continues to grow in popularity, predominantly among those who can and do understand the potential of digitally assisted education. In the following paper, I propose that the world of new technologies and the observed changes in the functioning of modern children open up new opportunities for teachers in early childhood education. This, however, requires a degree of transformative incentive on the part of teachers, both in terms of the organisation of children's education and their own further training.

Reflective teacher in the modern world

Modernity as a concept in common usage denotes the use of technological achievements or a manner of acting or thinking that breaks the traditional patterns, even the established values. An in-depth analysis of the issues of modernity is of a much more complex nature.

The concept of *modernity*¹ (Sztompka 2002, p. 558) is most often understood as a type of order and social conduct connected with accentuating a rational attitude towards the world. In modernity, rationality and the principle of doubt constitute a foundation in the process of formulation and solution of problems perceived in timeless and universal categories. Nowadays, the constant questioning of the existing state of affairs is considered a necessary property of all individuals and social groups, and as such, it is labelled as cultural competence of doubt (Toulmin 2005, p. 30)

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¹Without going into detailed analyses of the concept of modernity, I will merely point out that its definition is subject to numerous sociological considerations. It is most often of historical or analytical character.

In addition to the principle of doubt and references to rationality, modernity is also defined in the context of the emerging new social order. Changes in the organisation of social life are becoming a feature of modernity. Its roots can be traced back to the ideas of democracy, the rule of law and sovereignty of nation states, on the one hand and new forms of production, appropriation and distribution of goods, on the other.

Anthony Giddens, when referring to modernity, emphasises that it is characterised by the process of self-reliance. He indicates that the distinctive feature of all human activities is reflexive control of the undertaken activities. This means that the greater part of social activity and material relation to the world is subject to revision due to newly gained knowledge. However, it is not of incidental, peripheral character, but constitutes a structural part of modern institutions. Social practices are continually reviewed and reformed in the light of the influx of new information about these practices, which changes their character in a constitutive manner (Giddens 2002, p. 29).

Modernity is also characterised by the “production” of a specific type of man. This is due to the process of reflectiveness. Such people feature the following attributes: curiosity, vulnerability, as well as readiness to change, self-opinion and tolerance for difference, future orientation, sense of empowerment, future planning, trust in the social order, belief in predictability instrumented by the existence of permanent rules, sense of justice, striving for self-improvement and respect for the dignity of others. The last three have a normative value (Sztompka 2002, pp. 565-7). Reflectivity makes each of these characteristics form relationships with others, leading to mutual reinforcement.

The context of considering modernity and reflective control of action may be applied to teachers’ actions. Thus, reflective teachers possess cultural competence of doubt, are curious and willing to change and continuously improve. Their work also involves creating opportunities for pupils to experience curiosity seen as a drive to learn, to doubt, to self-improve, and to be ready to change. Reflective teachers become facilitators (Puślecki 2008, p. 18) of their pupils’ involvement in the learning process. The evoked curiosity is meant to fascinate, sometimes produce the ‘wow’ effect, but in the end it is meant to have the power to inspire a deeper scrutiny into the nature of phenomena.

Modernity, as I mentioned above, is associated with a change in the organisation of social life. Communication, negotiation and exchange of meanings constitute essential skills in modern societies, which is justified by the ever-increasing social mobility. In school classrooms, changes in rela-

tionships between participants in the learning situation also seem to be of great importance. The transfer of the focal point from teacher's activity to pupils' activity initiates working strategies based on peer collaboration, discussion, all forms of communication, exchange of thoughts etc. The external perspective is always inspiring, as it makes it possible to expand one's own experiences, manners of performing mental work, doing things and understanding concepts and phenomena, as well as the scope of assessment of events, thoughts and actions. Thus, learners can become tutors for one another, especially due to the fact that they are in equal positions, so they can shed the constraints and restrictions imposed by the unequal relationship with the teacher.

The modern world "beyond" the school naturally affects the way education "in" the school is organised. However, the change in educational traditions is so difficult that it must be instituted through the involvement of people, who either are or are not ready for change. The lack of will to make a change "in oneself" will result in the duplication and fixation of behavioural patterns that are not adequate to the needs of the modern world. It is also important for teachers to perceive the change in children, i.e. how they receive and process information, as well as in theories of learning.

A new generation of children and a learning paradigm shift

E-learning and e-textbooks are a natural consequence of the dynamic development of modern information technologies and features that characterise the modern generation called Z Generation or Multitasking Generation, sometimes also referred to as digital natives (Prensky, www.marcprensky.com/writing/). These are children born and raised in the world where new technologies were already in place. They do not know another world. They effortlessly navigate in the computerised world, have no difficulty finding everything in the network, are not afraid of using new devices, love new gadgets, find themselves doing several tasks simultaneously and thrive in the reality of parallel events. They are not surprised by things that are surprising for adults raised in the world of much less diverse media. Having said that, activities in the real world, such as contacts with other people, e.g. peers, may constitute a problem.

For children of the Z Generation, performing several tasks at once is quite natural, but it has its positive and negative aspects. It is required from teachers to appropriately select and monitor simultaneous tasks, which necessitate the involvement of various functions of the attention process. This is justified by the need to minimise the superficiality of task completion or problem analysis, as the depth of processing constitutes a significant

modifier of the effectiveness of the learning process (Żylińska 2013, p. 41).

There are four basic functions of attention listed by psychologists: selectivity, vigilance, search and control of simultaneous activities. However, it must be remembered that despite the diversity of functions, attention acts as an integrated cognitive system (Nęcka 1999, p. 80). If there are two things to do, it is important to make sure that they do not interfere. For example, you can read and listen to music or rock your baby at the same time, but simultaneous reading and answering questions is a big problem. It is important to involve different sensory modalities (visual, auditory), different memory codes (spatial and verbal) and different types of reactions (manual and verbal). Processing in these ranges is relatively independent, although the biggest concerns involve the separation of memory codes. The difficulty occurs mainly when two simultaneous tasks involve similar modalities, memory codes and reactions. That is why multitasking only makes sense when the right tasks are allocated (Spitzer 2007, p. 112).

Psychologists also point out that learning is influenced by experiences, and therefore the importance of pupils' own activity and thus the use of stimulating methods is emphasised. However, even an infinite number of experiences will not affect learning unless there is a focus on the problem to be solved or the content that one is about to learn. Brains do not change only under the influence of experience, but rather under the influence of those experiences that are subject to selective attention (Spitzer 2002, p. 113; Wood 2006, p. 81).

Nowadays, knowledge in the field of neurosciences enables an ever deeper understanding of the process of learning. It seems obvious that it is teachers who are most in need of knowledge about learning and therefore need to be included in teacher education programmes.

The use of knowledge in the field of neurophysiology, especially related to brain work, is only part of the knowledge that can modify the way teachers work with their pupils. It is also necessary to have a broader perspective on theories of learning, including those of socio-cultural character, that justify the need to change the approach to the organization of education. Below, I will present theoretical sources of the perspective of constructivist understanding of education. These include the following theories: J. Piaget's theory of intelligence development, cultural-historical psychology of L. Vygotsky, and cultural understanding of knowledge construction by J. Bruner.

Table 1

Sources of constructivism in education

J. Piaget	L. Wygotski	J. Bruner
<p>Knowledge is constructed in the mind as a result of physical and mental exploration.</p> <p>Manipulation on objects, experimentation and active cognition play a crucial role.</p> <p>Social interactions are also important, in the course of which differences in thinking or solving problems arise. This leads to cognitive conflicts which make it possible to rebuild structures and cognitive patterns in the course of balancing. Knowledge in the perspective of J. Piaget is in some way an individual interpretation, realized in the course of independent, spontaneous action. The role of the teacher is to create conditions and situations in which the student can independently explore and compare the results of the activities and thoughts of others with one another, make conclusions, make mistakes and correct them.</p>	<p>The knowledge of individuals is influenced by cultural and social factors. Apart from spontaneous activity, children learn concepts that are civilizational or cultural achievements. However, they do not assimilate them passively, but reconstruct them by linking them to their own experience and knowledge.</p> <p>This is done by means of cognitive cultural tools such as language or concepts.</p> <p>There is a significant participation of the teacher (who, depending on a given situation may also be a peer who is one step ahead), from whom pupils may "borrow" more mature ways of working, solving problems. Thus, they use a kind of "scaffolding" that supports the process of constructing one's own knowledge (by means of reconstruction, transformation of activities, ways of thinking proposed by the teacher, followed by their internalisation).</p>	<p>Knowledge is always embedded in culture, which is characterised by diversity and multiplicity of horizons.</p> <p>Also, it is not transmitted in the existing, ready form, but is re-created by successive generations and interpreted in a new perspective.</p> <p>This is done in the course of social negotiations and always in relationships with others. Other people's way of thinking and acting constitutes a point of reference, and striking a relationship is meant to facilitate the process of reconciling the meaning ascribed to reality, which always happens in a certain culture.</p> <p>It is important to acquire consent to personal language so that pupils can verbalise their own thoughts and reveal them to others.</p>

<p>Social interactions are also important in the course of which differences in thinking or solving problems arise. This leads to cognitive conflicts that allow you to rebuild structures and cognitive patterns in the course of balancing. Knowledge in J.Piaget's perspective is in a way an individual interpretation, realized in the course of independent, spontaneous activity.</p> <p>The role of the teacher is to create conditions and situations in which pupils can independently explore and compare results of own activities and thoughts with those of others, as well as make conclusions, make mistakes and correct them.</p>	<p>Initially, the activity is mutual and then it assumes individual, independent characteristics.</p> <p>It is important for the teacher to diagnose how well pupils make use of individual, reconstructed and internalised ways of thinking and acting.</p> <p>The role of the teacher is to diagnose the current state of children's experiences, to support them, to show opportunities, but also to encourage self-seeking of ways of working, understanding and thinking.</p>	<p>Perspectives and points of view represented by others help to ascribe meaning to phenomena in order to better understand them. They also make it possible to overcome the obviousness of schemes, to cross over and re-create solutions and ways of working, to open new solutions, bring ideas and new opportunities.</p> <p>The role of the teacher is to create opportunities to meet different perspectives, points, views. Time to reflect and enjoy the feeling of agency are also important.</p> <p>The most effective organisation of work is working in groups of different potentials, with a variety of points of view, ways of doing things, interests,</p>
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Source: own elaboration.

Learning, understood in the light of the above theories, can be very valuable and interesting for both pupils and the teacher if implemented in the world of new technologies.

New technologies in teacher's work

Among the already working methods, there is the so-called flipped classroom (kompetencje.org/), also known as reversed class or reversed school (Dylak 2013, p. 201), which, if well thought out and prepared, may provide both active exploration of issues, shared learning with teacher's involvement and reflections and social exchanges. It also enables direct focus on a specific problem, task.

The most important feature of reverse learning is the shift in the character and type of tasks performed by pupils at home. In traditional education, pupils are introduced to a new subject in the classroom, and at home they

practice and consolidate it. With the use of modern technology, this process can be reversed, i.e. pupils may receive a collection of materials for self-study so that the lesson can be devoted to discussing, exchanging points of view, understanding, ascribing meanings, experimenting, creating, solving problems, clarification of doubt, etc. Materials may assume a variety of forms, such as presentations, texts, films, instructions, explanations, adjusted to the level of pupils' perceptual and developmental potential. Reversed organisation of education also makes it possible to personalise the learning process as well as to increase pupils' commitment to work and promote interaction. It provides ample opportunities for the exchange of meanings between class mates as well as the teacher and particular pupils.

Inverted learning not only changes the way classwork is managed, but it also changes the way teachers prepare for lessons. It changes the focus of their activities and provides opportunities to involve more attention in observing the individual ways in which pupils work and adapt their tasks to their individual needs.

There are several stages in the process of teacher's preparation to inverted classroom activities.

1. Designing teaching materials
2. Creating the materials
3. Share them with pupils
4. Pupils' self-study with the materials
5. Classwork

Designing didactic materials before creating them makes it possible to adjust the level of difficulty to pupils cognitive potential, their attention span and time constraints. The designing phase can also be devoted to reflections on the presentation mode and content, adjusted to the tastes and preferences of the target group.

Creating materials is closely related to teacher's multimedia competence, so it is important to continually improve teachers' ICT skills. The most popular form is the use of audio-video recording. These are short mini-lectures, explanations, narratives, recorded in the form of videos that pupils play on their home computers. They may feature the teacher presenting a topic, but it may be just an audio lesson with teacher's comments on the presented material. Materials can also be multimedia presentations (such as Microsoft Power Point, Prezi) with advanced features (such as animations,

video inserts, audio recordings, links), allowing the creation of interactive, interesting materials to meet contemporary pupils' perceptual needs.

One advantage of such a format is the option to stop the recording at any time and repeat a selected fragment any number of times. This provides pupils with the opportunity to analyse a problem when it is difficult, to take notes, or view drawings or maps of important issues. The process of sharing materials can take place in different forms depending on the access to the necessary equipment at school and at home. One possibility is to use access to educational platforms such as Moodle, which makes it possible to share files with pupils (Wagner 2008, p. 59). The teacher can also email or forward the material by means of any other media.

Self-learning is an important component of inverted learning. Watching several minutes of material is meant to constitute an inspiration to consider the information, to think about the problem, to analyse the material, to take own notes, drawings or to formulate questions, doubts, etc. The advantage of this way of working is learners' choice of place and time to undertake the task, which enhances both comfort and effectiveness of the process.

Classroom work differs from standard lessons. Pupils arrive with prior knowledge, assimilated from the material provided by the teacher, and the class begins with the presentation of their concerns and/or observations. The teacher may also explain to individual pupils what was unclear to them, especially when the subject matter is complex, such as mathematical problems. The main part of the lesson may assume diverse formats. It may turn into a discussion, experiments, task solving or tasks producing activities. The tasks may be performed individually and may take into account pupils' individual needs or may be performed in groups, in accordance to teamwork rules. The teacher's task is to supervise as well as to provide feedback and possible assistance of various types in accordance with Vygotsky's concept of "building scaffolding".

It is worth noting that the use of flipped classroom requires a reflective attitude of the teacher and pupils. Due to the fact that it transfers a great deal of responsibility for the effects of self-learning on the learner, it involves a completely different type of preparation, permeated with attention to intellectual independence, critical thinking, sense of belonging and the acquisition of the necessary mental work tools. The features which should especially be scrutinised are self-discipline and systematic effort. Thus, appropriate motivational work is of importance in order to ignite interest and cognitive curiosity to become driving forces for learning. Errors play a different role from traditionally understood learning organisation, as in reverse learning they act as feedback constituting a stage of task work rather than

a source of experienced failure. They also make it possible to become aware that the effect of the learning process remains closely linked to invested work.

The use of the reverse learning model also requires the teacher to be highly committed to the process of continuous improvement. Also, the design and preparation of didactic materials is time-consuming and demanding, whereas classwork involves improving the observational skills and flexibility in helping pupils solve problems while working on tasks. This requires a great deal of activity on the part of teachers, although it is of different nature from that in the traditional teaching. Learners are also active because they consciously work on a task using the knowledge that they had previously ascribed their own meaning.

Both the teacher and the pupils must also display competence in modern technology.

E-textbooks as an interactive learning environment

E-textbook lies within the broadly understood, present in literature and in practical applications concept of e-learning (Juszczuk 2003, pp.150-168; also see: Juszczuk 2002; Wrycza, Wojtkowiak (eds.) 2002; Siemieniecki 2002, pp. 85-110; Lewowicki, Siemieniecki (eds.) 2009). It is becoming more and more common in various educational deliberations, not so much as a possibility to diversify typical activities, but more as an opportunity to organise learners' work around the use of new technologies. E-textbooks do not eliminate traditional textbooks and books, but open up new possibilities, by incorporating what traditional textbooks are incapable of incorporating. Traditional textbooks are closed (i.e. once printed, they do not change), they do not emit sounds, do not launch animations, do not open databases, whereas e-textbooks provide ample opportunities for virtual tours, visiting distant places to which travelling would not be possible, e.g. to the interior of a volcano. In addition, they engage attention, dynamise the process of education and respond to learners' interests and needs. If well thought out, they can help develop self-reliance and acquire the ability to self-monitor the process of self-learning. Teachers equipped with an e-textbook are in possession of a tool that has the potential of maximising their pupils' development.

The features of e-textbooks may be summarized in the following points:

- They are aimed at the generation of digital natives, who expect dynamics, change, multiple tasks, multimedia, because their natural operational environment possesses these characteristics.

- Access to all available educational resources and databases, including those in the network, because their structure, unlike the structure of traditional textbooks is open. The Internet provides unlimited access to data, such as encyclopaedias, dictionaries, lexicons e.g. <http://www.encyklopedia.pwn.pl>, <http://www.britannica.com>, <http://www.sjp.pwn.pl>, and others. These are also specialist websites, online archives (documents, iconography, photography, maps), e.g. <http://www.europeana.eu>. (Digital library Europe's civilisational achievements) <http://www.nac.gov.pl> (website of the National Digital Archives), <http://www.smarthistory.org>, (website with galleries and multimedia materials related to art and architecture of various cultural circles). The open nature of e-textbooks' structure is a novelty in relation to traditional textbook solutions and as such, it requires a change of perspective in thinking about their use in education.
- Their advantage is integration with other environments, such as educational platforms, electronic journals, websites, blogs, etc.
- The use of e-textbooks is possible through a variety of devices, from computer to tablet, e-book reader, smartphone, interactive whiteboard.
- They have a multimedia character, so e-textbooks support images, sound, animation and videos.
- They are available, together with their didactic content at any time and place.
- They enable the teacher to apply different working methods, applications, organisation of classes.

At present, work is being done on developing e-textbooks, which will be free and open to the public. Further materials can be already accessed by visiting the website www.epodreczniki.pl. E-textbooks for the youngest pupils have characters who guide the world of puzzles, mysteries and tasks. The tasks are interactive, permeated with travelling experiences and experiments. The platform also features methodological and didactic resources for teachers. Scenarios and guides are available. The authors of the platform list the following advantages:

- The textbooks can be used 24 hours a day, 7 days a week.
- E-textbooks are a comprehensive collection of open educational resources that are compatible with the core curriculum.

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- They are a tool facilitating pupils' knowledge and skills building through the use of a variety of multimedia forms of communication.
 - They will be available on an open Creative Commons license that will allow e-books to be used by teachers and pupils in a safe way, so that they do not infringe on intellectual property. It will also be possible to process the content contained in e-textbooks, for example, to create own copies of tasks or teaching materials.
 - E-books will be available from a variety of devices, such as computer, laptop, tablet, smartphone, e-book reader, interactive whiteboard.
 - They will also be available online and offline, so that they can be used even in the event of Internet problems.
 - They are also designed for use by pupils with dysfunctions (they are aligned to WCAG 2.0 standard at the primary level). They will also be available for Braille printing.
 - They can be integrated with other environments, making it possible to use them in any way, including any methods of teacher's work with pupils (www.epodreczniki.pl).

The use of e-textbooks requires a change in the manner of thinking about education. Many teachers express their doubts about working with the use of new technologies. On the one hand, they relate to the competence associated with the operation of the equipment, and on the other hand, they involve the change of working patterns according to the established and "safe" traditional methods. E-textbooks are intended to shift the emphasis of involvement in the educational process. Teachers will be most active when preparing (also personalising) materials for their pupils and then supervising their independent work. They will no longer be "sources" of knowledge, but rather organisers of learning situations for their pupils, whereas learners will be active, because working with a e-textbook leaves no room for avoiding the task. Each decision concerning task execution leads to a tangible effect, and learning assumes a form of a personalised process of developing learners' own skills and knowledge.

The future of new technologies in school education is a foregone conclusion. They will gradually replace old solutions, integrating technology that provides new potential and access to globally stored and shared information. The world is changing, and schools are working for the future of the next generations. Teachers, educated often in the past technology era, as

digital immigrants are expected to work with digital natives, a situation which is infested with new challenges, not only concerning the incorporation of new didactic instruments into their own practice, but also within the realm of self-development meant to adopt a different perspective onto the process of learning compatible with the expectations of modern children, so different from that which is well known to teachers from their past training and teaching experience. If stopping civilizational changes is not possible, then ‘taming’ them should be the answer.

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E-TEXTBOOK AND NEW TECHNOLOGIES. POSSIBILITIES AND NEW OPENINGS FOR THE REFLECTIVE TEACHER

Keywords: new technologies, flipped classroom, e-textbooks, reflexivity, constructivism.

The world of new technologies and changes observed in the functioning of contemporary children open new possibilities for early school education teachers. This, however, requires a shift in emphasis from teachers' activity to children's activity, initiation of work strategies based on cooperation among pupils, inclusion of discussion and other communication forms, exchange of ideas among education participants. This is to be achieved by means of new technologies, for example, e-learning or e-textbooks, which are a natural consequence of the dynamic development of modern information technologies. Such technologies are better adjusted to the needs and characteristics of the contemporary generation called Generation Z or Multitasking Generation. The author, using achievements of pedagogical and psychological theories, presents work methods applying new technologies which may be helpful to the teacher. These methods include: flipped classroom and e-textbooks.

Iwona Kopaczyńska

E-PODRĘCZNIK I NOWE TECHNOLOGIE. MOŻLIWOŚCI I OTWARCIA DLA REFLEKSYJNEGO NAUCZYCIELA

Słowa kluczowe: nowe technologie, odwrócona klasa, e-podręcznik, refleksyjność, konstruktywizm.

Świat nowych technologii oraz obserwowane zmiany w funkcjonowaniu współczesnych dzieci otwierają przed nauczycielem w edukacji wczesnoszkolnej nowe możliwości. Wymaga to jednak przeniesienia akcentów z aktywności nauczyciela na aktywność uczniów, uruchomienia strategii pracy opartych na współpracy uczniów, szerszego włączania, dyskusowania i wszelkich form komunikowania się, wymiany myśli między uczestnikami edukacji. Służyć temu mogą nowe technologie jak na przykład e-learning lub e-podręczniki, które są naturalną konsekwencją dynamicznego rozwoju nowoczesnych technologii informacyjnych. E-podręczniki są bardziej „dopasowane” do potrzeb i cech charakteryzujących współczesne pokolenie zwane Generacją Z albo Generacją multitasking. Autorka korzystając ze współczesnego dorobku teorii pedagogiczno-psychologicznych przedstawia sposoby pracy wykorzystujące nowe technologie, które mogą być pomocne nauczycielowi. Wśród nich są: odwrócona klasa tzw. flipped classroom oraz e- podręczniki.