Teaching and learning in information society: the importance of self-regulation and self-efficacy

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It is clear that the whole world has changed and that relationships have also changed and the classroom demands changes as well. Besides this, in order for learning to take place, beyond informative instruction, there is the need to re-invent and personalize the construction of knowledge. Then, this chapter presents the importance of self-regulation and self-efficacy to teach and learn in information society.

Keywords: study skills; learn process; information and communication technology

1. Learning and development in information society

Technology is more and more present in our lives each day, facilitating and accelerating our activities, be it at an office buying and selling stocks or at the family kitchen. With that in mind, Alarcão [1] introduces the school as a place that should be open, interactive and flexible so as not to become obsolete. The school must interact with the environment surrounding it.

Aiming at better characterizing the information society under the perspective of children and teenagers, a recent research was conducted by Nickelodeon in 12 countries on the use of technology involving 7000 participants from 8 to 14 years of age. For the research, the participants were selected to take part in a social network website and have access to at least two digital resources of communication, regardless of the socio-economical class they belonged to. The results showed that the access to the Internet, the use of cell phones, MP3 and I-Pod are part of the everyday life of the people interviewed and that they have no difficulty with this kind of technology; they are, by the way, highly skilled and competent in their technological actions [2].

It is clear that the whole world has changed, that relationships have also changed and the classroom demands changes as well. Alarcão [1] claims that there is the need to rethink the classroom by putting it into context. Assmann [3] already said that in order for learning to take place, beyond informative instruction, there is the need to re-invent and personalize the construction of knowledge.

This worry regarding the organization of schools, according to the review published by Joly [4], dates back to the beginning of the 20th century. Around 1900, Dewey compared the academic and social abilities developed by schools to the necessities imposed by society. It was verified that schools were not equipped or organized satisfactorily to attend the social language development of the students because the educational practice was based on the recitation of information from textbooks. Based on this observation, Dewey proposes a school turned to social demands: putting the student in direct contact with other adults to promote social conduct; teaching reading, writing and stimulating oral language in order to apply knowledge to social experiences of the student and to consider the school as a space where the student performs a series of different activities.

Nowadays, although Dewey’s ideas are still present in academic life and are still theoretically defended by educators in their speech, the evaluation of the educational practice in class shows that the teacher still controls and directs classes, that learning still takes place through the repetition of lessons and the reproduction of proposed models and that evaluation is exclusively determined by the teacher. Such considerations indicate that the teachers’ theoretical knowledge regarding the best and most efficient educational procedures does not guarantee that they will be put into practice [4].

The fast progress of science and technology, besides new facts on the educational scenario, determine, according to Alencar [5], that teaching should be aimed at preparing the student to question, reflect, change and create based on better use of their skills and potential. There is growing consensus among researchers from several countries on the need to promote more favorable conditions to develop creativity in schools.

Literature shows the need to increase school space for the development of creativity, preparing the student for the future, searching for solutions to problems and teaching them to think creatively. It also highlights the role of the teacher as the base to stimulate growth, expansion and expression of the student’s skills, as well as to build a positive self-conception [6-11].
Under this perspective, a lot has been said about the necessity for teachers to continuously work on their own development. Several planning meetings indicate different ways to motivate students to learn. However, little do we hear about the need to see students as beings in search of efficient and autonomous behaviors to promote their own learning [12].

Besides that, there is also the need to consider the human development happening in a systemic manner along the individual’s course of life, using as reference Bronfenbrenner’s theoretical model [13]. In order to do so, it is essential to consider that development is guided based on a micro-system that is peculiar to the person in interaction with a macro-system (society and culture) to which he/she belongs. It is in the micro-system that he builds his trajectory of life based on meaningful referenced behavioral standards, especially related to family and school.

According to Dessen and Costa Jr. [14], such idea goes beyond understanding the development as if divided in levels, but as a continuous and dynamic process. With that in mind, the school and its formal educational process become more relevant and play a larger role in defining goals for one’s cognitive, social and emotional development, as they guide one’s life trajectory and bring continuous changes into one’s course of life.

Thus, according to Ricci [15], the importance of education today is unprecedented. The Industrial Era led to the Information Era and to the importance of growing continuous education. A new, agile world has come and we constantly need to check whether schools are continuously adapting in order to promote Education that allows teenagers to face new challenges successfully.

Kiyosaki and Lechter [16] make a comparison between the Industrial and the Information Eras, saying that in the Industrial Era, merely attending school, graduating and starting a career was enough. Things did not change rapidly, so the Education acquired at school sufficed. Nowadays, in the Information Era, when close to retiring, many people realize that they did not have the appropriate education to face the world they lived in. It could be verified, for the first time in history, that many people with a high education level faced the same financial difficulties as those with a lower level.

Kiyosaki and Leschter defend that the rules have changed. The necessity today is to study, get good grades, find an internship or job and, only then, prepare for professional life. Next, with such rapid changes, one should look for another job, prepare for it and so on. In agreement with that, Ricci [15] defines the worker of the Information Era as a multi-skilled, undisciplined creator: they know how to work in teams, do not have a specific function, change jobs constantly, have a lot of information and are highly creative.

In order to achieve this, college education has become a necessity. As a result, it can be observed that in the past years, the number of college/university students has increased dramatically. These students have diversified backgrounds in terms of social class, gender, objectives, expectation, school history, age, employment situation, choice of the shift to study, etc [17]. This diversity in the universe of college students has gained visibility in scientific investigations in the last years due to the fact that many of these students get to college/university with insufficient knowledge, low motivation and poor study skills [18].

As a result, in college/university level we can find students with all levels of involvement in their studies when we compare students within the same institution, students from different institutions, students in the same course and even students in the same class and subject. According to Accorsi, Bzuneck and Guimarães [19], it is necessary to understand the quality of the involvement as being more than the intensity of the effort or dedication to the study, but also in what the student invests their time and skills during academic activities.

This imposes rigorous challenges onto the university, especially regarding the quality of the teaching-learning process developed [20]. Very often, institutions, as well as teachers, question the teaching processes, the lack of students’ interest and how to face the problem and improve the quality of students’ learning [12].

Globalization, potentialized by computers, e-mails, social networks, the speed in communications and the constant growth of knowledge, has produced so much information that the students are incapable to absorb all of it. In order to learn, the student needs to be taught how to manage the amount and diversity of data they will have to work with daily [21]. The need becomes evident for both schools and universities to interact with the accelerated transformation the world is going through in order not to become obsolete. It is necessary to become flexible to meet the demands of the current dynamics of the world, characterized by openness and interaction (Alarcão, 2001). The school needs to prepare the students to be capable to adapt to new contexts, facing problems and new situations, transferring the knowledge acquired in class to their everyday lives [22].

It can be readily noticed that memorization, known as an inseparable component of the teaching-learning process, cannot be considered as the main objective. The student obviously needs to exercise their capacity to retain symbolic codifications, which will allow them to establish a network of meanings that will connect all their knowledge and keep them aware due to its affective and usual character. However, this cannot be the exclusive goal. Besides retaining information, the students must be capable to understand it, relate it with their surroundings and attribute a personal meaning to it in order to be able to keep it and apply it in the long run to transform and get to know themselves [23, 24].

Consequently, it is imperative for colleges and universities to focus their investments in teaching methodologies that promote dynamic and active learning by the students, searching for the development of self-regulation and autonomy competences when necessary [25].
2. Self-regulation in the learning process

Study Skills have been the object of specific attention by researchers in the fields of Education and Educational Psychology [26-28]. These study skills are defined by Crede and Kuncel [27] as the capacity of acquisition of the study and method strategies the student has as well as the capacity of time and resource management regarding academic issues. Similarly, Robbins and others [28] have also defined study skills as behaviors that are directly related to a productive performance, which is a determining factor in academic success.

Therefore, it is clear that researching on study skills, particularly in college and university education, involves taking into consideration the central and active role of the student’s in the learning process. This way, the processes of learning self-regulation are central in their cognitive, motivational and behavioral ramifications [29]. Researchers [18, 30, 31] claim that, regarding students’ academic autonomy, most of them get to university with poor competences to auto regulate their own studies efficiently. In this scenario, it is necessary to define self-regulation, according to Zimmerman [32], as being the capacity of the student to generate thoughts, feelings and acts in order to achieve their objectives.

Therefore, self-regulation is more than a mental capacity or an academic action skill. It is a self-direction process through which the learners are able to transform their capacities in academic skills. This process is based on, among other aspects, the degree of awareness the students have of their own possibilities and limitations, of how guided they are towards their goals focused on knowledge as well as the appropriate strategies available [25]. If course syllabus and the academic preparation of teachers are analyzed, one can notice the lack of preparation of both to face the integration of the students in this level of education, let alone help them develop strategies of self-regulation of their own learning [33, 34]. These studies show the need for teachers’ intervention in the sense of involving the students in their own academic work, making them aware that their auto regulation skills are essential and relevant in order to succeed in learning.

Studies have shown there is variability in students’ level of learning according to the presence or absence of auto regulation skills [35, 36]. It is suggested, therefore, that auto regulation skills may be as much or even more relevant than mental aptitude when we attempt to explain academic performance [37]. It has gradually been recognized that, regardless of the number of hours spent studying or the use of a certain strategy, its relation with performance depends on the cognitive processes involved in the process of learning [38].

Motivation, on the other hand, is inserted in this context because it will influence the student’s involvement or persistency in learning tasks. The importance that the learning situation will have to the students will depend on how they will assess their own goals, the perceived level of difficulties of the tasks and the rewards they expect to receive. Thus, researchers conclude [39-41] that any given model of learning attempted will involve, implicitly or explicitly, motivation as work directly related to academic performance.

Besides, Bandura adds to the concept of self-regulation by saying that “if people don’t believe they have the capacity to produce results, they will not try to make things happen” ([42], p.3).

Bandura, a Canadian psychologist, has contributed since 1977 with the different areas of knowledge on human behavior, with the development of the works on self-efficacy, denoting it as a belief the individual has in his own capacity to perform a certain task successfully. This belief, in some way, may affect the individual’s choices and both school and professional performance [43].

The works on self-efficacy has been the target of several researches in the international scenario [32, 42, 44-51]. However, when we look into the reality of Brazilian research, this same intensity cannot be noticed. Consequently, it becomes clear the relevance of new studies for deeper understanding of the importance of auto regulation skills in the context of the Brazilian reality.

There is the need to point that studying self-efficacy implies taking into account the Cognitive Social Theory (CST). According to Azzi and Polydoro [52], the self-efficacy theory is inside the Cognitive Social Theory. Therefore, discussing self-efficacy not taking CST into account would decrease the possibility of the analysis. It is also important to briefly mention the Cognitive Social Theory in order to better explain the self-efficacy belief. This theory is still being constructed by the author, Bandura, and it consists on his proposition for a series of theoretical works formulated by him trying to explain human behavior. The theory presents a proposal to explain the functioning of human beings based on an interactive determinism in which personal and environmental determining factors that influence one another [53].

According to this model, behavioral determination is probability-based, as it depends on human capacities (symbolization, anticipation, auto-reflection, vicarious learning and self-regulation). It is a self-referring system that allows the individual to deliberately act in order to achieve a specific goal, plan and anticipate results, invest in action plans, evaluate and re-plan attitudes [45, 46, 54]. The logic behind CST is the constant relation between the individual and the environment, denominated by the reciprocity system. This system allows the person to take control on his/her future as well as to set limits to self-direction [42]. Moreover, based on the perspective that behavior is determined by
several personal and environmental factors, Bandura understands self-efficacy as one of the key mechanisms that compose what he calls “the human agency”.

Based on this idea, Azzi and Polydoro [52] define self-efficacy as the competence judgment for the execution of a specific task or a determined set of tasks about one common topic. They also discuss the different formulations that this work had inside Bandura’s Cognitive Social Theory from 1977 to 1997, highlighting that every movement went towards the idea of “a phenomenon of subjective character” as they took into account beliefs on competence/capacity one had on being an agent in his/her won trajectory organizing and executing. They also emphasize that the concept of self-efficacy is related to setting and achieving goals (p. 14).

Bandura [54] brought into discussion the role of evaluation for efficacy beliefs. As the human being is sensitive to judgment changes, depending on the circumstances, the author presents three fundamental dimensions for self-efficacy evaluation to be adequate: magnitude, referring to the levels of difficulty of the specific activity itself; strength, involving the level of intensity of an individual’s belief in his own capacity to complete a task; and generality, dealing with the amplitude of the self-efficacy beliefs (if related to a more general or more specific domain).

Therefore, self-sufficiency perception is not related to the number of abilities a person has for carrying out a task, but to the evaluation (judgment) they make of the possibilities they have, to carry it out under different circumstances. It is related to the judgment someone makes about his or her possibility of dealing with the presented question [54]. According to the author, self-efficacy interferes with the choices made, with the efforts made for the realization of those choices, and with the persistency and degree of satisfaction at the end.

Medeiros, Loureiro, Linhares and Marturano [55] made a research meaning to assess the relationship among academic performance, self-efficacy and behavioral aspects. 52 children of both genres, aged between 8 years old and 11 years and 11 months old, students from first to fourth grade participated; those were split into two groups: G1, with difficulty in learning complaints – were sent to Psychology Consultation, and G2, with good academic performance, evaluated through school performance test. Self-Efficacy Assessment Form and Rutter Child Behavior Scale A2 were used, besides the school performance test.

The results have suggested that children who complained about learning problems showed a low sense of self-efficacy. Besides, they had been evaluated by parents as having more behavioral problems than children who have good performance in school, and again there comes the importance of establishing a positive self-efficacy belief for the success of learning.

It is important to talk about the process of constituting a belief of efficacy. According to Bandura [54, 56-58], self-efficacy beliefs are built from information obtained from four sources, which are direct experience, vicarious experience, social persuasion and social, physical and emotional states. The most important is direct experience, considered the most efficient, once it takes into account the experiences lived by a person.

The obtained success contributes to heighten the belief in the efficacy of a person; on the other hand, failures may put it at risk, mainly if such self-efficacy is still tenuous. Let’s highlight that this analysis is not made only with the results, but it is also a result of characteristics of chores and context.

The vicarious experiences, second source presented by Bandura, is the information obtained through observation and comparison to different social models. Observing people, who are similar to each other carrying out the same chores and succeeding in their efforts, may raise the belief of efficacy through modelling. The impact of modelling in the perception of self-efficacy is influenced by the perception of similarity that one believes to have in relation to the model. Costa [59] says that by observing the characteristics of a model, one compares them to their own, and this way verifies the effects the model had on the performing of their activity, positive or negative. In a similar situation one can conclude that the same result will be achieved, through modeling, and decide to perform an activity or not.

The third source of reinforcement in the belief of efficacy proposed by Bandura is social persuasion. When people are persuaded that they can perform a task, they tend to work harder and keep trying longer. Pajares and Olaz [60] believe that the influence of persuaders to perform a specific task has an important role in the positive or negative development of self-efficacy belief, for positive persuasions may encourage one to strengthen the belief, while negative development may weaken it. Azzi and Polydoro [52] believe that significant social sources for a person such as teachers, parents, friends, media characters and others, may be the persuaders with great results, once there is correspondence between the ability of the person and the execution of the task.

In line with the authors, we can mention the research made by Samsudin [49], based on the Cognitive Social Theory of Bandura, with 221 students from many institutions in Lisbon. The objective was to study the relation between the beliefs of self-efficacy, within the transition, with work and social support noticed in college senior students. The results showed a positive and meaningful relation among the studied variables. This relation is more evident regarding social support noticed by friends and others in general. Overall, the obtained results indicated that social support from the family, friends and teachers may be key elements in the development of beliefs of self-efficacy in this transition.

The fourth and last efficacy generator source is the perception of physical and emotional states such as stress, tiredness, anxiety, well being, pain and joy. People depend, partially, on the perception of these states for the judgment of their capacities. This perception works as a filter for the self-efficacy analysis and may occur before or during the activity. Poy and others [61] concluded in their study with students, that it might be possible to assume that a positive mood generated an increase in self-efficacy, which in consequence, made the subjects face a cognitive task as a goal to
overcome, and not like a stressful situation, dedicating more effort to it, and persisting, despite difficulties. That reinforces the importance of this fourth factor for the formation of belief and efficacy.

Thus, self-efficacy is a belief that one has about their abilities of involving their cognitive capacity, motivational and behavioral, to perform a specific job at a certain time and under some circumstances. Still under the theoretical framework of Bandura, this belief of self-efficacy changes due to the dynamics surrounding an individual and their interaction with the environment, especially considering the amount of information available on the internet and the offered online courses, as well as the number of access, made by the young, to this network [62].

It is worth highlighting the effect of the kind of learning path and the level of self-efficacy in technology on students’ attitudes, on the amount of individual and group interaction, and on the result of learning from online courses based on asynchronous communication through discussion forums, studied by Chen [63]. The outline was experimental; there were 310 participants, university students, divided into 34 groups who acted according to one of the two forms previewed in the path, (structured and self-directed), and according to a certain degree of self-efficacy in online technology (high or low). It was not highlighted a meaningful difference in student learning related to the kind of path used; and the students with lower levels of self-efficacy in technology had a more positive participation in the structured path, while students with higher self-efficacy had a better performance in the self-directed path.

Thus, considering that self-regulation and self-efficacy, together with motivation and a student’s capacity, truly volitional and self-determined, [32], one may ask how such processes apply to information society. Martins [64] argues that only by equipping schools and offering informatics courses to teachers is not enough to generate a majority of technology skilled students, mainly in public schools. Many times computers are placed in a classroom called “laboratory”, which can only be opened with the presence of a technician. How can one relegate to a technician the responsibility of letting students into a “global village”?

3. Information Technology and Communication for meaningful learning

The advent of information technologies and communication has put into question the traditional school teaching strategies. Such school was considered the holder of knowledge and students would go there to acquire the knowledge saved there. Those ties have been broken by ITC, which opened the doors to a globalized world, allowing their students to have access to the most variable kinds of information, transforming then, the role of the teacher into a learning mediator and advisor, which means that the teacher has to be skilled at using technologies for education [65, 66].

To conceptualize technology for education, according to Pfromm Netto [67], it is necessary to think both under the instrumental aspect that serves teaching and learning as a technological resource and the aspect of changes that the learner goes through, reflexes of theory, research and mental, behavioral and physical resources development. The first function of technological resources – the television, the computer, the compact disc, the blue ray, the Ipad – is to give teaching and learning pedagogical support once they have many possibilities for interactivity.

Computer networks and all technologies that appear every day enable students to participate in a “global community”, notice the world and their participation in this world, which is very different from their parents’. Information crosses borders freely, with no mediators to decide what is the news, what is good, what is fun, what is ethical. It runs the world and is available to all those who want to know it. Therefore, the student can talk to the NASA staff or understand, through their own research, what it is like to face a tsunami, by talking, virtually and in real time, to those who are facing such tragedy [68].

It is also important to realize how technology can help reduce inequalities between students from the rural area and those of big city centers. The Internet has made it possible, through search engines, relationship websites and so many other resources that all students who have access to a computer can have a pool of options for the development of their learning.

Besides, as they break down the communication barrier and relate to local people or to people who are far away, they can start learning to respect the existing differences of customs, languages and politics. The understanding that the importance of ideas and the exchange of knowledge outshine race, social level and looks will be allowed. The view of the world and the place occupied in it has changed for students, which leads them to think in a global way.

As they communicate with people who are kind of far away, they start understanding, appreciating and respecting similarities and differences among languages, cultures and politics. It is internalized that race, looks and social level do not matter, but the exchange of ideas and knowledge and the value of some of these ideas and knowledge do. The view of the world and the place occupied in it will surely change. Students will be naturally led to think about issues of global interest [68].

These changes are a fact and there is not a way to hide reality under a teaching cape based on spit and chalk. The picture of the traditional school shows quiet students in a row with their school materials in order and answering the teachers’ questions according to the book. Their learning evaluation is more focused on the memorization of content and answers according to the teacher’s thoughts than on the reflection and building of knowledge skills.

Coloring archaic methods and giving them an updated appearance does not help, for those sound fake. The same happens to schools, which many times do not convince or attract people [12].
Having realized the growth of the IT market, the Indian government established partnerships for software development between companies and Indian universities. As a prerequisite the government has taken over the responsibility for basic education, and established the beginning of the teaching of English in kindergarten; they have also provided students with students bank loans aiming at prospective talents. Nowadays around 200 thousand professionals are put on the market every year by India, while in Brazil, 15 thousand professionals graduate every year.

The IT market goes through a boom in India and employs around 65 thousand people every year. The Indian company Tata hires around two thousand people in Brazil, but they could hire 10 thousand people if Brazilians, besides having IT knowledge, spoke two or three languages. This is the new world in which students belong [69].

In this sense one can recall that for Dewey ([70], p17), “education is a process of rebuilding and reorganization of experience, through which we realize, more keenly, the sense, and with that we are able to drive the course of our future experiences”. Therefore, education must be an active process in which the student who learns, acts in their own learning, so that what was learned makes sense.

That might seem to be beyond the opportunities granted by the traditional teaching methodology, a model used by most teaching institutions in Brazil. Actually, the activities done in school come fractioned, splitting knowledge into different study fields, in a logic that many times does not correspond to the every day experiences of students [71].

School activities are usually developed within a routine that does not allow the unique expression of students. They follow almost everything, normally in a passive way, at the whim of an academic content designed by somebody who does not know it. So students sit in their chairs, are suffocated by a great amount of information disconnected from life and meaningless in their view, and are absolutely sure that most of that information will not be useful to them [71]. Children, teenagers and adults need and search for a meaning in their experiences.

A student, principally a child, is characterized by curiosity and perplexity, being, this way, in a position of searching for meanings. Their questions and apprehensions involve their interest in uncovering the reality that surrounds them. They search for reasons and explanation for their experiences. Thus, how can one learn based on a pedagogical practice that favors the memorization of contents? Meaningful learning really happens when a student is able to relate the taught content or what has already been taught, and contextualize it within new situations [72].

Therefore, learning means the change of attitudes and behaviors. Learning is not connected to the memorizable meaning of the words, but to the appreciation of meaning, in other words, to meaningful learning.

The development of ITC within a scholar environment is mandatory once this is the reality in which students are. Leaving this technology into the background is to highlight whatever is superfluous; it is to offer the teaching of meaning of the words, but to the appreciation of meaning, in other words, to meaningful learning.

A school that has teachers aware of the use of technologies will realize changes taking place very fast. The teaching strategies will be changed; the teacher will take the role of the mediator and advisor of the global learning process of the student.

Teachers who are skilled in using technology within their pedagogical practice lead students into acquiring this ability. Besides, it is emphasized that only those teachers who are skilled at using technology within teaching and learning situations have the ability to lead a student to use the most advanced possibilities of technological devices and resources [73, 74].

Marinho [75] inserts challenges to the contemporary teacher in this context. They will, constantly, reflect over their pedagogical practice, making their teaching adapted to education within a globalized society that experiences the information era. They shall leave behind the role of “leading actor on the school stage” and become a mediator, a facilitator, never lessening their importance within the educational process.

He goes on asserting that the teacher should spend much more time on coming up with teaching strategies so that the student is challenged to think about the reality of their everyday life. Teachers should know their students, talk with them, and understand their needs and wishes, discuss with them, a way to reach those. They shall ban the isolation of their work and exchange ideas with the other teachers, be stimulated and stimulate others to find the best strategies to educate citizens. Finally, the challenge of the needed, mandatory and continuous formation: being updated is the key word to be stuck to the conscious teacher.

Why is it so difficult to get rid of what is criticized in order to really change? Will it only be lack of awareness and attitude? It is not easy to get rid of what was experienced all life, making a habit crystallized.

Rubem Alves, understanding the moment of anguish of a teacher who faces changes, for them very difficult ones, wrote that “learning clings to us in a terrible way, and it is what was learned that stops me, (the teacher), from learning something in a different way.

So it is necessary to “unlearn” what was learned (…), forget what is known to remember what was forgotten. It is necessary to have new eyes to see old things in a different way [76].

The teacher intentionally wants to teach. However, teaching does not correspond to only transferring knowledge, but to creating possibilities for its production or construction, in other words, choosing meaningful learning. Using technology in all most creative ways a teacher finds, is working with the eyes fixed on providing meaningful learning, which can be lived in the everyday life of students. It is preparing them to become real world citizens.
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