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# Educating for the future: A conceptual framework of responsive pedagogy

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**Abstract:** Schools of today are educating for an unknown future, and knowledge of today will become partly irrelevant in 20–30 years. Teaching and assessment focusing on the learning of factual knowledge will not serve the needs of the learners in the future, as it does not prepare for life-long learning in a per today not definable future. The main goal of today's schooling should be to support students in learning how to go about learning. The aim of this position paper is to define responsive pedagogy in relation to self-regulation, self-efficacy, achievements and assessment. The concept responsive pedagogy used in this paper is the recursive dialogue between the learner's internal feedback and external feedback provided by significant others. The core of responsive pedagogy is the explicit intention of the teacher to make learners believe in their own competence and ability to successfully complete assignments and meet challenges, to strengthen students' self-efficacy, and to increase their overall self-concept. Responsive pedagogy is hypothesised to impact achievements positively, yet this needs to be carefully researched. Today's schools should prepare for tomorrow, and educate independent self-regulated learners who believe in their own capacity to engage in continuous learning and knowledge production.

## ABOUT THE AUTHORS

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## PUBLIC INTEREST STATEMENT

Today's schools educate children who will be active citizens in our society 50 years ahead. If we go 50 years back in time, could we then possibly image the world as we experience it today with its technology, social media and information flow? Knowledge is accessible to all, it is not anymore the sole property of teachers, whose job was to transmit knowledge to future generations. Children of today, and citizens of the future, have to learn how to search for information and to be capable of taking control of their own learning to acquire relevant knowledge. Most of all, they have to believe in their own competence to learn, to develop, and to contribute to society. This paper discusses how math teachers can provide students with feedback which helps them discover how they can best learn math and how to develop trust in themselves and their ability to learn.

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## 1. Introduction

Responsive pedagogy is about educating for the future. Schools of today are educating for the future—an unknown future, and knowledge of today will probably become partly irrelevant in 20–30 years. Teaching and assessment focusing on the learning of factual knowledge will not serve the needs of the learners in the future, as it does not prepare for life-long learning in a per today not definable future. The main goal of today's schooling should be to support students in learning how to go about learning. Some countries are forward looking and have made, or are in the process of, making changes in the curriculum which reflect an increasing awareness of the need to provide students with learning skills for the future. Scotland, for example, says about their recent Curriculum for Excellence that it is "a direction of travel" and that the implementation is not intended to be completed (personal communication Louise Hayward, May 27, 2015). The curriculum evolves around four capacities; to enable each child or young person to be a successful learner, a confident individual, a responsible citizen and an effective contributor. The curriculum aims to ensure that "all children and young people in Scotland develop the knowledge, skills and attributes they will need if they are to flourish in life, learning and work, now and in the future" (Education Scotland, s.a.).

Another country which has updated its curriculum aiming at preparing learners for the future, is Singapore. Here, the goals of schooling is to educate the next generation to become confident, self-directed, capable of actively contributing to team work, risk taking and concerned citizen. Within the general framework of the curriculum, there is no specific mentioning of standards or achievement goals within the various school subjects (Ministry of Education Singapore, s.a.).

Finland, a country known for its successful education in terms of achievements, has not been object to multiple educational reforms. However, in 2016, a new future directed curriculum is being launched with focus on life skills such as growth as a person, cultural identity and internalisation, and media skills and communication. Additional foci relate to educating active and responsible citizens, e.g. participatory citizenship and entrepreneurship, responsibility for the environment, well-being and a sustainable future, safety and traffic, and finally technology and the individual (Finnish National Board of Education, s.a.). Schools are expected to take their responsibility of preparing children of today for society of tomorrow.

In Norway, similar thoughts are not yet visible in the national steering documents, however, the Government in 2013 appointed a committee to examine students' learning in the future school. The report was published in June 2015, and the main recommendation is to develop students' academic, social and emotional competence to enable them to act in, and positively contribute to, the future society. Skills such as critical thinking, cooperation, complex problem solving and scientific inquiry are specifically mentioned as important, and meta-cognitive learning strategies, including self-regulation, are recommended to be strengthened, even though it might be at the cost of a broad academic factual knowledge (NOU, 2015, p. 8).

The common core in the above curricula and report is that they all stress the importance of educating independent, creative and active citizens with the concern for other people and the society as a whole. They do not explicitly emphasise more traditionally valued skills such as reciting textbooks or passive obedience, commonly practiced by engaging students in rhetorical dialogues with teachers and subject them to summative assessment of factual knowledge. In more future looking curricula, the knowledge foundation is supplemented by activating the learners in the learning processes. The learners are engaged in problem solving, encouraged to pose relevant questions and to be confident in their own learning, both as regards how to learn and their ability to learn. Bells

(2010) in her paper "Problem-Based Learning for the 21st Century: skills for the future" summarises her contribution by presenting the following keywords: project-based learning, twenty-first century skills, inquiry, authentic learning, motivation, creativity. In addition to learning to handle the unknown (inquiry, creativity) affective aspects of learning are becoming central when discussing future skills. David, Solberg, de Baca, and Gore (2014) found in their large study that mastering social emotional skills such as academic self-efficacy, academic motivation, social connections, importance of school, and managing psychological and emotional distress, and academic stress significantly discriminated successful students in secondary education from those who failed or dropped out of the system. The researchers define "academic self-efficacy as perceived competence in performing a range of academic activities needed to be successful within a school setting" (p. 171). Academic motivation relates to whether "students are motivated to attend school because it is perceived as a relevant, meaningful, and/or enjoyable learning experience", and autonomous motivation refers to "engaging in an activity because of its perceived meaningfulness and relevance" (p. 171). They suggest, referring to Zimmerman (2011) that one of the implications of their work is that by strengthening students' social emotional skills, academic performance will be improved, as their self-regulation is strengthened. Worthwhile noticing is also the work of Hulleman and Harackiewicz (2009), who suggest that students need to understand the relevance of education in pursuing future goals.

Taminiau et al. (2014) propose the concept "on-demand education", meaning that it is the individual learner who determines his/her own learning pathway according to his/her own learning needs. They illustrate the process by presenting a cyclical learning model suggesting that the students perform a task, assess their performance on the task to identify their individual learning needs. Subsequently they find a new task which helps them to fulfil their learning needs and improve their performance (p. 2). The learners can follow the cyclical model at their own pace and learning becomes individualised and responds to the progress of each learner. The cyclical model by Taminiau et al. (2014) strongly resembles Kolb's (1984) model of experiential learning which has been used mainly when looking at the learning of practitioners. The work of learning is a practice, the students' practice, and as practitioners they are expected to be actively engaged in and forming their own learning. Today there is an evolving understanding that young learners will benefit from similar engagement.

There is support in the literature that learning for the future is best built around problem solving activities and acquiring appropriate learning skills such as self-regulation skills and believing in personal competence to successfully face tasks and unexpected challenges. This requires a different instructional encounter (Smith, 2001) which is focused on responding to the students' learning by means of an educational dialogue in which feedback is central. In this paper, we call this kind of instructional encounter *Responsive Pedagogy*, and it differs from traditional teaching mainly in the form of detailed pre-planned lessons according to a fixed curriculum. Van Manen (1995) uses the concept "pedagogical thoughtfulness and tact to describe the improvisational pedagogical-didactical skill of instantly knowing, from moment to moment, how to deal with students in interactive teaching-learning situations" (Van Manen, 1995, p. 8). He refers to his own work from 1984 and 1986, which strongly resonates with Herbart's notion of pedagogical tact from 1802, more than 250 years ago. Responsive pedagogy requires "tact and thoughtfulness", however, it differs from Van Manen's notion by having a stronger focus on feedback and assessment. Herbart's and Van Manen's pedagogical principles are strongly challenged in the school of today which is driven by accountability, measureable achievements, and the main criterion for good teachers is the students' scores on standardised tests. From the current directions in education, thinking of the future, it seems that pedagogical approaches discussed more than 250 years ago seem to be what is required in educating children to function in the future. However, the question is if today's teachers and those who are being educated in current teacher education programs, have the attitude, the knowledge and the competence to educate for the future by engaging themselves and their students in responsive pedagogy.

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The aim of this position paper is to define responsive pedagogy by reviewing some of the literature related to self-regulation, self-efficacy, achievements and assessment. In the following, the notion of "responsive pedagogy" is explained in relation to well-known concepts such as self-regulation and self-efficacy.

## 2. Self-regulation

This brief overview of self-regulation will first present definitions of self-regulation as found in the main literature sources before it presents claims made by researchers as regards the relationship between self-regulation and achievements. Next, a discussion of how self-regulation relates to feedback follows, and finally the two concepts self-regulation and self-assessment, and how they are connected is addressed.

### 2.1. Definition

Zimmerman is perhaps one of the major names related to self-regulation, and in a 1989 paper, he claims that self-regulated learning (SRL) takes place when an individual is a meta-cognitively, motivationally, and behaviourally active participant in his or her own learning. A more specific definition is presented in a later paper where he refers to self-regulation as self-generated thoughts, feelings and behaviours that are oriented to attaining goals (Zimmerman, 2000b). Zimmerman elaborates on this definition in his 2002 paper where he argues that self-regulation is not a mental ability or an academic performance skill; rather it is the self-directive process by which learners transform their mental abilities into academic skills. Learning is viewed as an activity that students do for themselves in a proactive way rather than as a covert event that happens to them in reaction to teaching (p. 65). In this clarification, Zimmerman points at the learner as the active agent for self-regulation by taking charge of the learning process instead of depending on the teacher and the teaching activities. Self-regulation is a way of enacting mental abilities which are then used as artefacts in academic learning processes.

Pintrich's (2000) definition of the concept aligns with Zimmerman's work, however, points at some kind of order, by relating self-regulation more specifically to the learners own goal setting: SRL is the process whereby learners set goals for their learning and then attempt to monitor, regulate, and control their cognition, motivation, and behaviour in order to reach their goals (Andrade, 2010, p. 91 referring to Pintrich, 2000).

A slightly elaborated definition is given by Pintrich and Zusho (2002) who provide the following working definition of self-regulation:

> Self-regulated learning is an active constructive process whereby learners set goals for their learning and monitor, regulate, and control their cognition, motivation, and behaviour, guided and constrained by their goals and the contextual features of the environment (p. 64).

A number of key words deserve to be noted in the above definition, first that learners set the goals for their learning, and second that self-regulation does not only relate to the cognitive aspects of learning, but also to affective aspects such as motivation. Third, self-regulation takes place within a given context and learners are restrained by this context.

The learning process can be, according to Zimmerman (2000b) divided into three phases, each of which controlled by the learner. The three cyclic phases are (1) *Forethought*—the reflective processes that precede actions, and it includes assessing personal competence to undertake the tasks, planning and goal setting. (2) *Performance or volitional control*—the self-monitoring taking place when working on the task, assessing the effectiveness of chosen strategies, and if the learner finds it necessary, making changes. Affective aspects of the process influence decisions made during this stage which heavily depend on feedback from self and significant others. (3) *Self-reflection*— assessment processes that take place when the task is completed and the learner re-examines the learning process as well as the learning outcome. Self-regulation refers to the learners monitoring of

the learning process, and they are able to look at their own learning in relation to a specific task or to a course with a meta-perspective.

Andrade (2010) in a more recent paper defines self-regulation as exercising executive control over one's own learning or, to use the lingo of young students, "being the boss of yourself." More formally, SRL is a dynamic process of striving to meet learning goals by generating, monitoring, and modifying one's own thoughts, feelings, actions, and, to some degree, context (p. 94).

Drawing on the above sources, we suggest that a working definition for self-regulation in the current project is that "The learner is in charge of his/her own learning processes by setting goals and monitoring, at a cognitive as well as affective level, the individual learning process needed to achieve the goals".

### 2.2. Self-regulation and achievements

"Theoreticians seem unanimous—the most effective learners are self-regulating" (Butler & Winne, 1995, p. 245). Zimmerman (1990) also concludes that learners who take initiative activated by intrinsic motivation and take on responsibility for learning, are successful academically. Zimmerman's claim is supported by more recent work by other researchers (Andrade, 2010; Pekrun, Goetz, Frenzel, Barchfeld, & Perry, 2011) as well as by his own research of later dates (Schunk & Zimmerman, 2002; Zimmerman, 2000b). Zimmerman (2000b) sees the relation between self-regulation and achievements not only in a short-term perspective related to a specific task, but in a long-term perspective suggesting that self-regulated learners are more optimistic about their future opportunities. Moreover, he claims that self-regulation plays an important role in a life-long learning perspective, a claim which is supported by Boud (2014) that empowering students to become independent and self-regulated learners in a life-long perspective should be one of the main goals of education.

Reflecting the literature, we propose that supporting learners in becoming self-regulated has a positive impact on their learning and achievements in a short as well as long-term perspective, thus self-regulation is a key-concept in enhancing learning.

### 2.3. Self-regulation and feedback

Butler and Winne (1995) present a model in which they illustrate the interplay, or dialogue, between self-regulation and feedback. The basic assumption of the model is that when learners are given a task, the way it is perceived by the learners is strongly connected to their prior knowledge and beliefs, their domain knowledge, strategy knowledge and multiple motivational beliefs (self-efficacy). Based on this, they set the goals for their engagement with the task, and decide on strategies and tactics in how to approach the task to achieve the goals. Upon completion of the task, they will assess it in light of their own goals and criteria. During the process, the self-regulated learner will monitor the process and the progress. This is all related to internal feedback, feedback provided by the learner to her/himself when engaged with the task. The affective aspects relate to the learners' belief in their own competence and the way they perceive the possibilities to achieve the task goals (Bandura, 1997). If the learners do not believe in their own competence, they are likely to abandon the task or to reset the goals, to make them more achievable (Hattie & Timperley, 2007).
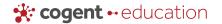
However, the internal feedback is, according to Butler and Winne (1995) and supported by Nicol & Macfarlane-Dick in a later paper (2006), influenced by external feedback from peers and even more so, by feedback from the teacher. In learning situations, it is often the teacher who sets the goals and owns the criteria according to which the level of achievement is measured at the end of the process. If goals and criteria are in disagreement with the learner's goals, the learners might experience tensions which become a source of stress in the learning process. Dweck's research points at the close relation between learners' perception of ability and learning, and the important role external feedback from significant others play in how learners value their own competence and ability (Dweck, 1999). Butler and Winne (1995) propose a model illustrating a constant dialogue between the internal and external feedback which affects the learning processes with the task given.

The more actively the learner engages in this dialogue, the more meaningful the learning process is experienced, and the better the learning outcome. Nicol and Macfarlane-Dick (2006) expanded Butler & Winnie's model by illustrating how feedback can strengthen learners' self-regulation processes and thereby also the achievements. There are seven points in the expanded model: (1) clarifying what good performance is, (2) facilitating self-assessment, (3) deliver high quality feedback information, (4) encourage teacher and peer dialogue, (5) encourage positive motivation and self-esteem, (6) provide opportunities to close the gap, and (7) use feedback to improve teaching (Nicol & Macfarlane-Dick, 2006, p. 203). These points align with the work of other researchers discussing how feedback can empower student learning. Sadler (1989), as well as Black and Wiliam (1998) claim that in order to achieve learning goals, students need not only to be informed about the goals, but they have to understand them, and make them their own. Self-regulated learners set goals for themselves, and as discussed above, when there is a gap between the learners' and externally given goals, it might cause stress. Thus, when the learners are in the first phase of self-regulation, the forethoughts (Zimmerman, 2000b), the feedback dialogue between the learner and the teacher is needed to form a shared understanding of the learning goals which creates the foundation for the further learning process with the task. Hattie and Timperley (2007) argue that feedback should not only be on the task, the goals and the outcome, but also on the process and the strategic choices learners make during the learning process. This aligns with Zimmerman's second phase of self-regulation, performance or volitional control, during which the learner monitors the learning process and if necessary, decides to make necessary changes. It is the learner who is the agent of this process, however, useful feedback from the teacher if it is accepted by the learners, is likely to enhance learning. Research suggests that the quality of feedback at this stage of self-regulation is problematic as much external feedback focuses on the task and the achievement of the goals of the task. Sadler (1989, 2010) in his work argues strongly for the need for learners not only to feel ownership of the task goals, but also to be fully informed about, understand, agree with, and being able to implement the criteria for assessing the outcome of the learning process. Sadler (1989, 2010) argues that learners have to be able to recognise what good performance is by becoming familiar with examples of good performance. Only when there is an understanding of personal prior knowledge needed to complete the task (Zimmerman's phase 1) and clarity about the desired outcome (the assessment criteria) (Zimmerman's phase 3), can the learner search for and decide on strategies needed (Zimmerman's phase 2) to achieve the learning goals. To enhance the learner's understanding throughout the process, the internal feedback has to be attuned and specified in a dialogue with external feedback, the teacher and/or peers. This is what Butler and Winne (1995) call "provide opportunities to close the gap", point five in the above model. Hattie and Timperley (2007) formulate this three-stage process by posing three questions learners should be given answers to by the help of external feedback: Where am I going (the goals)?, Where am I (current stage)?, and Where am I going next (the process)? When discussing relations between self-regulation and feedback theories, the conclusion is that internal and external feedback intertwines in a dialogue which forms the volitional strategies, learning processes and the learning outcomes. It is essential that the learner is an active agent in the learning processes, and that learner agency is accepted by the teacher.

### 2.4. Self-regulation and self-assessment

A basic assumption in self-assessment theory is that the learners are active at all three phases of self-regulation, and self-assessment is an inherent feature of self-regulation either it is articulated or not (Andrade, 2010; Butler & Winne, 1995; Nicol & Macfarlane-Dick, 2006). The question is how the teacher elicits the internal feedback, the learner's self-assessment, to make use of it in forming the self-regulation processes and enhance the learning processes. In order to establish a dialogue between internal and external feedback, the learner must be given a voice and a say in forming their own learning. Andrade (2010) claims that self-assessment in working on tasks involves three steps, (1) articulating expectations, (2) critique of work in terms of expectations, and (3) revision in light of external feedback. Andrade's step three, revision, is less discussed in the literature on self-regulation, and it proposes an expansion of the learning process. On the other hand, revision can also be part of Zimmerman's (2000b) phase 2, the self-monitoring during the learning process. With this understanding, the learning process does not end upon the first completion of the task, but in a

dialogue between internal and external assessment, feedback on a first complete product is fed back into the learning process for continuous and improved learning.

The concept "responsive pedagogy" reflects the above discussion around the relation between self-regulation, achievements, feedback, and self-assessment, and it is supported by Butler and Winne's (1995) theoretical synthesis of feedback and self-regulated learning.

> Self-regulated learning (SRL) is a process that unfolds step-by-step over time. It is also recursive; that is, internal monitoring of a current state in a task, the trigger for engaging SRL, generates feedback that, in turn, is input contributing to the learner's regulation of subsequent cognitive engagement. Thus, modelling feedback in the context of dynamically self-regulating processes calls for an account that considers simultaneously how cognitive processing unfolds as a function of regulative feedback and how feedback is generated or accessed within cognitive processing. (Butler & Winne, 1995, p. 246)

## 3. Self-efficacy

The concept self-efficacy is established as a unified conceptual framework that provides understanding of motivation and the origins of efficacy beliefs, as well as their structure, function and effects (Bandura, 1995). The origin of the concept stems from the social cognitive perspectives of Bandura (1977) and his assumptions of human development and exercise of control of desired outcomes. Human agency is grounded in the individual's beliefs in efforts made to produce desired outcomes. Bandura states that individuals guide their lives by their beliefs in personal efficacy, or efficacy beliefs. Bandura's work have contributed to and developed cognitive perspectives of how the human brain processes, organises and retrieves information (Bandura, 1993; Bandura, Caprara, Barbaranelli, Gerbino, & Pastorelli, 2003). Human agency is also regulated by motivation, emotions and self-regulatory processes, and people tend to make causal explanation to human agency. Bandura (1993) underpins people's beliefs in their own capacity to exercise control over their lives. These efficacy beliefs influence people's thoughts, feelings, motivation and actions. Self-efficacy, therefore, is concerned with people's beliefs about ability to organise and execute the courses of action needed to learn or perform behaviours at designated levels (Bandura, 1995). "Perceived self-efficacy refers to beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments" (Bandura, 1997, p. 3).

The concept "perceived self-efficacy" was first introduced by Bandura (1977, 1995) to explain how personal expectations and beliefs influence task performance. Furthermore, perceived self-efficacy beliefs influence goal setting and effort put into accomplishment of given tasks (Bandura, 1997). Referring to Bandura, Usher and Pajares (2008) define self-efficacy beliefs as

> (…) to help determine the choices people make, the effort they put forth, the persistence and perseverance they display in the face of difficulties, and the degree of anxiety or serenity they experience as they engage the myriad tasks that comprise their life. (Usher & Pajares, 2008, p. 751)

In Zimmerman's analysis of the concept, he states that "Self-efficacy beliefs are not a single disposition but rather are multidimensional in form and differ on the basis of the domain of functioning" (Zimmerman, 2000a, p. 83).

Self-efficacy beliefs are domain specific, and they differ according to physical and social context (Bandura, 1997; Skaalvik & Skaalvik, 2004; Zimmerman, 2000b). Self-efficacy is not related to personal traits, but to the individual's efficacy belief to perform in a given situation (Bandura, 1997) or in school, self-efficacy is very much related to specific school subjects. In Bandura's foundation of the self-efficacy concept, he refers to three factors that inform how individuals interpret results of their performances; (1) personal factors such as cognition, (2) affect and biological events, and (3) behaviour and environmental influences. These three factors form a triadic reciprocity which determines human agency (Bandura, 1997; Pajares, 1996). They do not, however, have equal strength,

and their influence will vary according to different activities and circumstances as well as socio-structural influences. For example, qualities of the relation between a teacher and the students will have an impact on the students' self-efficacy and their actions (Pajares, 1996).

### 3.1. Outcome expectations and expectancy value

Bandura (1997) differentiates between expectancy beliefs and outcome expectations. Former experiences with a similar task and efficacy beliefs are often correlated (Zimmerman, 2000a). Self-efficacy influences activities and actions people engage in, and people's judgements of their own capabilities to successfully complete a task will influence their choices of action (Pajares & Schunk, 2001). Outcome expectations denote the individual's expectation to the outcome of a certain action, and are related to the expectancy value of the action (Bandura, 1997). Outcome expectations impact individuals' judgement of the outcome and consequences of their actions, and will effect the effort put in the performance. Positive expectations can function as incentives for action, whereas negative expectations can be demotivating (Bandura, 1997). At the same time, the value of performance influences efficacy beliefs and the effort made. Motivation is directed by expectation that certain behaviours will produce certain desirable outcomes (Bandura, 1993; Schunk & Zimmerman, 2002).

### 3.2. Self-efficacy—self-esteem/self-concept

Self-efficacy differs from the concept self-esteem. While self-efficacy refers to specific beliefs of human agency faced with specific tasks, self-esteem is related to a more stable judgement of a person's ability to perform in general. A term close to self-esteem is self-concept, and Zimmerman (2000a) builds on Marsh and Shavelson (1985) when he states that "self-concept is a more general, self-descriptive construct that incorporates many forms of self-knowledge and self-evaluative feelings" (Zimmerman, 2000a, p. 84). Skaalvik and Skaalvik (2002) have identified five key antecedents to self-concept, called frames of references. They distinguish between internal and external frames of references, which relate to academic self-concept: Judgements of own achievements, causal attribution, appraisal from significant others, mastery experiences and psychological centrality. Skaalvik and Skaalvik (2002) refer to Bandura (1997) in discussing mastery experiences as an important source of self-efficacy. The relation between self-concept and self-efficacy is salient in Bong and Skaalvik's (2003) claim that self-concept shows a general perception of oneself in a domain, whereas self-efficacy expresses a person's expectations of achievements in a given situation.

### 3.3. Self-efficacy and self-determination theory

A person's self-efficacy towards a specific task will have an impact on the effort put into it, and the result of one's actions will influence self-efficacy, feelings, thoughts and expectations towards own capacity to succeed (Bandura, 2006). A person with high self-efficacy towards a task will produce engagement and effort to a higher degree than a person with lower self-efficacy towards a task, in other words, she will be more motivated. In Ryan and Deci (2000), self-determination theory human motivation is based on three basic psychological needs—the need for competency, relatedness and autonomy. Self-determination theory posits that humans choose goals, domains of behaviour and relationships that satisfy these psychological needs (Rodgers, Markland, Selzler, Murray, & Wilson, 2014). Ryan and Deci state that perception of efficacy or competence must be followed by an experience of self-determination to be intrinsically motivated (Ryan & Deci, 2000). Intrinsic motivation is related to perceived competence—the more competent a person perceives herself towards an activity, the more intrinsic motivated for the activity. However, feelings of competence must be accompanied by autonomy to enhance intrinsic motivation (Fisher, 1978; Ryan, 1982; Ryan & Deci, 2000) and perception of influence on the result of one's effort. Self-determination theory assumes that human beings have an innate tendency to develop skills and competence, as well as socially adapt to the environmental conditions (Deci & Ryan, 2007). Social environments, such as classrooms, can function as facilitative or impeding on human agency and the natural tendency for engagement and development (Deci & Ryan, 2007).

Social-contextual events, e.g. feedback, promoting feelings of competence during action can enhance intrinsic motivation for that action, accompanied by the experience of self-determination. This means, however, that also feedback which has a negative impact on self-perceived competence, can be demotivating. Both self-determination theory (Ryan & Deci, 2000) and the concept of self-efficacy (Bandura, 1997) are generated around the idea that humans need to perceive they are capable of performing (Rodgers et al., 2014). While self-determination theory posits the need for competence and to master challenging tasks, the concept self-efficacy refers to "beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments" (Rodgers et al., 2014, p. 528). Bandura (1997) states that self-efficacy relates to a person's confidence and beliefs for performing. Rodgers et al. (2014) argues that both theoretical concepts seek to explain goal pursuit and attainment, as well as generative in the way the concepts relate to behavioural engagement, learning and acquisitions of skills. Rodgers et al. also argue that "both are cyclical in the sense that when one's need for perceived competence is met, or when one feels self-efficacious in a particular behavioural domain, each is strengthened, and therefore, the likelihood for performing the associated behaviour again is enhanced" (Rodgers et al., 2014, p. 529).

### 3.4. Sources of self-efficacy

There are four major factors effecting self-efficacy. Efficacy beliefs are influenced by mastery experiences, verbal/non-verbal persuasion and vicarious experiences, as well as physiological and affective states (Bandura, 1997; Pajares, 2008; Pajares & Usher, 2008).

Bandura (1994) emphasises mastery experiences as the strongest and most effective source of self-efficacy, and points out vicarious experiences as an important source (Bandura, 1997). A student's efficacy beliefs can also be influenced by the performance of others, and especially if the student identifies with the others. Seeing others succeed through effort might influence the observers' efficacy beliefs and make them believe in their own capabilities (Bandura, 1994). A third source of self-efficacy is verbal and non-verbal persuasion, which refers to an individual's perception of other people's beliefs in him/her (Pastorelli et al., 2001). Social persuasion and feedback that concentrate on supporting the learner and show belief in the learner's competence and capacities might lead to greater effort and personal efficacy (Bandura, 1994). The fourth source of self-efficacy is the individual's interpretation of physiological and affective state (Bandura, 1994). Both reducing stress reactions and negative emotions, as well as learn to interpret emotional and physical states can generate self-efficacy (Bandura, 1997).

Responsive pedagogy is sensitive to affective sides of learning and aims at strengthening students' self-esteem/concept at a more general level, as well as students' self-efficacy within a specific domain or in relation to a specific task.

### 3.5. Self-efficacy and academic achievement

The learners' personal perception of competence and mastery has, in the same way as self-regulation, been found to function as a predictor for academic achievement (Bong & Skaalvik, 2003; Ferla, Valcke, & Cai, 2009), and a number of studies have shown evidence of self-efficacy related to academic achievement (Dinther, Dochy, & Segers, 2010). Based on the assumption that self-effcacy is domain specific (Bandura, 1997; Usher & Pajares, 2008), studies have shown that self-efficacy is important when looking into subject-specific achievement, e.g. math (Jungert & Andersson, 2013; Parker, Marsh, Ciarrochi, Marshall, & Abduljabbar, 2014).

### 3.6. Responsive pedagogy

Within the framework of the above discussion, our understanding of the concept *responsive pedagogy* is the recursive dialogue between the learner's internal feedback and external feedback provided by significant others, e.g. teachers, peers, parents throughout the three phases of self-regulation; forethoughts, monitoring and reflection. An essential part of responsive pedagogy is the explicit intention of the teacher to make learners believe in their own competence and ability to successfully

complete tasks and meet challenges, to strengthen students' self-efficacy in relation to a specific domain/task and to increase their overall self-concept. Responsive pedagogy is hypothesised to have a positive impact on achievements, yet this needs to be carefully examined through research.

## 4. Conclusions

School and the classrooms form social contexts, and feedback from teachers as well as peers affect students' beliefs in own competence, the effort they are willing to put into a task and the will to succeed. Thus, responsive pedagogy as understood in the current paper is crucial to students' motivation for learning, it is through the learning dialogue that teachers are positioned to strengthen, as well as weaken, students' beliefs in the possibilities for mastery. Responsive pedagogy, if practiced with pedagogical wisdom and skills, can promote student learning, however, teacher feedback can also hamper student progress if it is perceived as negative and threatening by the learner. The question is the extent to which teachers practise responsive pedagogy which enhances student learning. Do they have the required knowledge and skills, in other words, the competence to understand and act on the principles of responsive pedagogy, or do they need to engage in a learning process to understand its importance and translate the understanding into practical skills?

Knowledge of today will have less relevance in tomorrow's society, and as such, students' competence to seek, acquire, and develop new knowledge is just as important, if not more, than internalising currently available factual information. Today's schools need to prepare for tomorrow, and educating independent self-regulated learners who believe in their own capacity to engage in continuous learning and knowledge production should be the aim of today's society. A small, yet significant contribution to this evolving understanding is operationalisation of the concept of responsive pedagogy, which is, in fact, a revival of old pedagogical perceptions, but with a focus on feedback and assessment.

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