I Can't Yet and Growth Mindset

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> Context • There are often children in schools who are at risk of failure because they have a view that their capacity to learn is fixed. Adults often reinforce this view. Children may be helped by providing counterexamples to show how failure can be overcome by persistence, trying different approaches, and by inviting them to reflect on ways to overcome their own challenges when learning new skills. **> Problem** • Teachers' implicit constructions of intelligence may interfere with their role helping children in school learn to approach problems with confidence. Our approach aims to change teachers' and children's constructions about learning with a view to helping children with their learning challenges in primary school. So, it is centrally about learning to learn. This study provides an opportunity to see whether it would be valuable to examine key ideas in growth mindset in a well-designed constructivist educational framework concerned with learning to learn. **> Method** • The article is based on a qualitative analysis of one teacher's views and of children's interactions, using classroom video. The first author devised a set of lessons for a teacher to use in class around themes of learning to learn emotional aspects of learning. Use was made of positive models of individuals who overcome negative feelings and succeed. The children were videotaped in class and their interactions and conversations recorded. The aim was to describe the conceptual changes achieved by the teacher and the children around the concept of second-order learning or learning how to learn. **> Results** • Children's views of themselves as learners changed and so did the teacher's views of learning and intelligence. As an approach to learning for children who are in danger of thinking of themselves as failures, the results are encouraging. **> Implications** • The article is a demonstration of the possibility of changing teachers' and children's constructions of intelligence as fixed to a more positive flexible construction that children can learn to learn and overcome failure. Teachers working with children in difficulty will find the constructivist ideas about learning to learn helpful. Future research within a constructivist framework is needed to establish optimal timing for interventions of this type, to assess whether ability grouping may hinder the alteration of ideas about intelligence and to examine the durability of the changes in teachers and children. **> Constructivist content** • Growth mindset is based on social learning theory, but implicitly it includes strong constructivist ideas. We consider our research to be similar to previous constructivist work on changing children's representations and an example of Gregory Bateson's concept of learning about learning. **> Key words** • **Growth mindset, learning to learn, concepts of intelligence, children with learning difficulties.**

Introduction

« 1 » The ideas children and teachers have constructed about learning have a profound influence on children's school performance. Hugh Gash (2014) discussed constructivist ways of changing personal-social prejudices towards children with learning difficulties. The current article is about changing fixed ideas about both intelligence and learning that may impede children's learning. William Glasser (1986) explained the problems that arise for teachers when children get into their heads the idea that learning is hard and school is not for them. Carol Dweck (2012) promoted ideas about learning to learn called "growth mindset." Here these ideas are used as an avenue of intervention to help children who are having difficulty in school. Our main goal is to help children understand that their problems with some school tasks are temporary and if they construct new approaches, they can find solutions. A supporting idea is that intelligence is not a fixed quality but is malleable, and another is that teacher expectations play an important role in how they treat children in their classrooms.

« 2 » Since 1999 the curriculum in Irish primary schools has been based on constructivist principles.[1] In addition, in disadvantaged areas in Ireland there have been a variety of educational initiatives to "Deliver Equality of Opportunity in Schools" (DEIS) initiated by the Department of Education and Skills.[2] Schools in disadvantaged areas were identified and targeted to receive additional supports under the DEIS action plan. Here we describe an initiative designed to promote growth mindset in a DEIS school to assess its effects on the children's and the teacher's thinking. The outcome should indicate the suitability of the approach for further study. In a constructivist context, the aim is to help the children build a positive image of themselves as learners to overcome the damaging effects of not having such an image (Glasser 1986).

« 3 » The growth-mindset approach is directed to the thinking of both teachers and children. In the context of Albert Bandura's ideas about self-efficacy (Bandura 1986), it has been shown that children's beliefs about themselves can greatly affect their motiva-

1| https://www.curriculumonline.ie/Primary/Curriculum

2| DEIS (Delivering Equality of Opportunity in Schools): An action plan for educational inclusion. Department of Education and Skills, Ireland, 2005. https://www.education.ie/en/Publications/Policy-Reports/deis_action_plan_on_educational_inclusion.pdf

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tion to learn, which, as a result, affects their academic performance at school (Dweck 1999). In affecting motivation and self-confidence, growth mindset can help children who face additional challenges because of their socioeconomic circumstances (Claro, Paunesku & Dweck 2016). This theoretical base differs from constructivism, however, there are two central ideas underpinning growth mindset that sit comfortably within constructivist approaches to learning.

a Gregory Bateson (1972: 159ff) described fact learning as first-order learning, whereas second-order learning or deutero-learning involved learning contexts. This second-order learning is the "learning about learning" central to growth mindset. Teachers and researchers each have various ways to discuss learning, each way having its own theoretical implications. The importance of helping children to change the way they think about learning, or construe learning, is central to both of these theories.

b There is the use of questioning and counterexamples designed to encourage children to reflect on the ways they are construing events used in Gash's (2014) constructivist approaches to changing children's stereotypes and prejudices. When a child is on task trying to act to reach a goal, and something goes wrong from a teacher's perspective, the teacher can then intervene, presenting another related task in an attempt to find out what might have gone wrong or to provide a task that the child might solve, make a suggestion that might redirect the child, or to make a decision that the child might not have the schemes to solve the current task, etc. At this early stage in schooling, Dweck (2012) believes it is possible to help children to learn to be persistent and find solutions to difficulties.

« 4 » Growth mindset emphasizes the malleability of intelligence. Mathematical and language skills were major components of well-known intelligence tests such as the Stanford Binet, which was based on Alfred Binet's work at the beginning of the 20th Century. The psychometric reliability of the IQ test has become associated with the idea that intelligence is fixed. More recently, Howard Gardner (1983) developed a theory of multiple intelligences, so moving from a theory of general intelligence to consider additional forms of activity in which people excelled. At about the same time, Robert Sternberg (1990) developed a view of intelligence that emphasized the role of adapting to the environment, like a central idea in Jean Piaget's theory that radical constructivists construe as reframing ideas about experience. These more flexible approaches to intelligence are helpful to educators concerned to identify ways of helping children succeed in school.

« 5 » Standardized testing in Irish Primary Schools has been used increasingly in the last decade with a view to helping teachers identify children in need and providing learning support (Conway & Murphy 2013).This leads to a danger that identifying children may give either the teacher or the child the idea that their difficulties are due to fixed abilities (Boaler 2013; Keogh & Whyte 2008; Hart et al. 2004; McGillicuddy 2013). In addition, grouping by ability (gifted, average or weak) contributes to the labelling of children. Students who are considered disadvantaged tend to score lower than their peers on most standardized IQ tests (Lyons 2002). For teachers who consider ability to be a fixed characteristic, the notion of ability is incompatible with promoting equal opportunities (Gillborn & Youdell 2000). So, the fixed-ability paradigm creates a reductionist and simplistic narrative in which higher intelligence may become correlated with middle class and lower intelligence with working class (Reay 2005). Children may find this a worry, and it may lead to a fear of failure and avoidance of challenges (Dweck 1999). For teachers, the importance of their expectations for pupils and their expectations was well documented in the classic book *Pygmalion in the Classroom* (Rosenthal & Jacobson 1968).

« 6 » Carol Dweck (2015) also argued that testing practices are an antithesis to growth in children. Testing is further complicated by the inherent competition that it fuels. Competition increases the need for division, separation and exclusion as inevitably not all children will succeed: "This means abandoning notions of equality and meritocracy, and deploying strategies which require economic, cultural and social capital" (Tomlinson 2008: 64). Carol Dweck advocated growth mindset as an alternative educational strategy with its malleable approach to intelligence:

> "Growth mindset is based on the belief that your basic qualities are things you can cultivate through your efforts. Although people may differ in every which way – in their initial talents and aptitudes, interests, or temperaments – everyone can change and grow through application and experience." (Dweck 2012: 16)

Central to this malleable approach in the present study is the idea that change to teachers' and children's representations of learning are determined by their own choices and may be facilitated by suitable classroom experiences that provide opportunities for reflection on their classroom problem solving.

« 7 » Initial work on (radical) constructivism emphasized educational applications, particularly in maths and science (Jaworski 1998; Wood & Sellers 1997). Later, teachers' constructions of teaching were shown to guide their approaches to children with learning difficulties, with different emphases in different countries (Rault, Molina García & Gash 2001). The teachers' constructions were found to vary and influenced the teaching strategies they recommended. In the present study, one aim is to facilitate changes in the teacher's approach. New events create opportunities for learning and when children are challenged, they have an opportunity to overcome previously constructed constraints. The teacher presented reflective contexts in which children's ideas about some constraints to learning could be challenged and questioned using examples from the growth-mindset approach. While the teacher's approach might be direct, an important constructivist feature is facilitating reflexivity in the children about the value of persistence and varying their approaches in the face of difficulty. In the constructivist framework, this is not an adaptation to the classroom but rather something the children choose themselves as their interpretation of the classroom context (Gash 2014).

« 8 » The approach taken in the classrooms in this study followed the example of Mandy Swann and her colleagues, who initiated a project with Cambridge University called "Learning Without Limits." This

used growth-mindset ideas that we found helpful as a model for our work. They based it on the belief that children do not have predetermined capabilities. They worked with nine teachers in a range of contexts, demonstrating in different ways how they rejected the idea of fixed abilities in their classrooms. The aim was "to learn from and give a voice to teachers motivated by a particular view of learning: learning free from the unnecessary limits imposed by ability-based practices" (Swann et al. 2012: 4). One of the most salient proposals in the project was the idea of transformability. This was defined as an unassailable belief in the potential for change or transformation in current patterns of achievement based on the teachers' beliefs and actions in the present (Hart et al. 2004). Teachers were encouraged to use language that did not adhere to the concept of fixed ability, to resist the pervasive testing culture insofar as possible, to develop positive relationships with the children, not to group children by ability and to provide a rich range of activities in the classroom. The project sought to provide a classroom context in which children and teachers work together to change each other's expectations concerning children's learning.

« 9 » Inspired by the "Learning Without Limits" project, the intervention described here was designed by the first author, consisting of lessons teaching about growth mindset. It was based around six guiding principles; empowerment, praise, trust, co-agency, choice and alternatives to ability grouping (Swann et al. 2012). Video tapes were made of the lessons that were subsequently transcribed for analysis. The aim was to assess the effects of such a programme on the children and the teacher working in a DEIS school. Growth mindset provides a social-learning context to helping children overcome ideas that may inhibit their capacity to learn. However, how children construe learning and their learning to learn is a fundamental ingredient in this change. As such, the study provides a significant opportunity to assess the pedagogical and constructivist potential of trying to facilitate positive ideas about schooling as advocated by Glasser (1986) and about leaning to learn as described by Bateson (1972).

Method

Sample

« 10 » One second-class classroom (7- to 8-year-olds) was selected with 22 children (13 boys, 9 girls) in a DEIS urban school in Leinster. The 27-year-old female teacher had two years' teaching experience. Following Dublin City University ethical procedures, permission was sought from the school, the teacher, the parents and the children. As part of this process, the study was explained in plain language and signed agreement forms were collected from all participants.

Procedure

« 11 » The researcher explained and discussed the guiding principles underpinning the intervention with the participating teacher and then with the children in the class. As the lessons were video-taped, one pilot session was arranged in the class to familiarize the children with the process. Ten lessons were designed by the researcher. These were taught over a five-week period. The video-taped lessons were transcribed for analysis of the language and interactions. The teacher was interviewed at the end of the intervention to gain insight into her experience. A semi-structured interview was used as it was the most appropriate to gain as rich an account of the teacher's perspective as possible (Kvale & Brinkmann 2009; Hatch 2002). The sections in the interview were as follows; Introduction, Warm-up and Context, Guiding Principles, Growth-Mindset Lessons, Role of the Video, Individual Differences and Cool-off and Closure. The video tapes were transcribed after the study for analysis.

The lessons

« 12 » The researcher constructed the lessons, ensuring they were easy to administer for the participating teacher, age-appropriate for the children and that they had an engaging range of activities. The lessons had a clearly stated learning intention both for the teacher and for the teacher to share with the children. The six guiding principles were central to the lessons (empowerment, praise, trust, co-agency, choice and alternatives to ability grouping) and could be applied to other lessons taught during the experimental period in whatever way the teacher found appropriate. One common lesson objective was finding out about the children's thoughts, experiences and feelings surrounding their learning. Unearthing the children's voice was important, so there were plenty of opportunities for discussion. As the children were young (seven and eight years old), the researcher often used picture books to introduce concepts and ideas about the meaning of growth mindset. Additionally, these pictures were used to empathize with story characters and to stimulate discussion and critical thinking. What makes the lessons constructivist are the opportunities provided to challenge the children's ideas when they found a lesson difficult by introducing ideas about how to approach whatever it was that was difficult.

« 13 » The lessons included a range of practical activities for the children, including incorporating digital technology and arts-based creative activities. These were included to appeal holistically to the children and to cater for and teach to multiple intelligences (Gardner 1983). For some of the lessons, the children had to complete some written work, including drawing pictures and writing sentences. These documents were used as part of the data collection and contributed to a rich data source yielding valuable information about the children's thoughts and experiences (Creswell 2014).

« 14 » In this qualitative study, the first author sought to clarify an audit trail from lesson construction to video to data analysis and interview (Lincoln & Guba 1985). Different types of data were used to allow triangulation: video observation, written work and interview. Further, "member checking" by the participating teacher was used to ensure that the findings were representative. In these ways, the first author sought to ensure that her imprint on the study in the lesson design did not have an undue influence on the findings.

« 15 » Each lesson plan specified resources, objectives, an outline with questions, and a follow-up activity. From a constructivist point of view, the lessons provide opportunities for the children to build on their ideas of learning, especially through understanding how noticing mistakes provides opportunities to change, and that persistence is an important part of this process.

« 16 » Lesson one was based on the book *Elastic Fantastic Brain* by JoAnn Deak (2010). With the children sitting around so they could see the book, the lesson was introduced by asking the children to think about what brains do and how they think about how brains work. Questions included asking about children's favourite things to do, remembering when they first learned various things like football and hobbies and how they improved over time. The follow-up included questions about challenges, mistakes and persistence. Lesson two reinforced lesson one, using playdough to emphasize how our brains are elastic and can stretch. Lesson three was based on the things the children were good at and the things they would like to improve. This included discussions about things like riding a bicycle, which they did not know how to do yet, and how making mistakes was an opportunity to learn and not an occasion to experience failure. The lesson finished with considering how they might improve their skills.

« 17 » Lesson four was based on the value of making mistakes because they are opportunities for learning, and included *The Girl Who Never Made Mistakes* by Mark Pett and Gary Rubenstein (2011) as a resource. The children were asked to discuss mistakes they had made and what they had learned from them. Lesson five was designed to consolidate the previous lessons and introduce the idea of growth mindset as a way of thinking about learning. During the lesson they discussed famous people like singers and football players and how they were persistent in overcoming difficulties and learning their skills well. Lesson six developed the language around growth mindset and included a bag of paper statements. The children were asked to decide whether they represented a fixed or a growth mindset. These included: I can't do this / I can't do this yet; This is too hard / This may take some time and effort. Discussion was around the value of growth mindset, the importance of the words we use to describe tasks (too hard, I am not good enough, I can do it). Lesson seven was based on a children's book called *The Dot* (Reynolds 2010) designed to encourage children to take risks and learn from them in the domain of art. In the story, a child who thinks she cannot draw is encouraged to overcome her doubt by making a design with dots. Lesson eight was based on the book *Giraffes Can't Dance* by Giles Andreae (2001), which encourages children to have confidence in themselves. Lessons seven and eight included discussion of the pupils' own successes and failures and how they felt and how they learned from their experiences. In this way, the teacher could challenge the children's perceptions of their abilities so they had opportunities to reflect on and reconfigure their self-concepts. Lesson nine was a follow-up lesson on the book, *The Dot*, on artistic expression with opportunities for the pupils to discuss their art work and their feelings about their work. Lesson ten was a revision lesson discussing concepts on growth mindset encountered in earlier lessons and how it helps school learning.

Results

« 18 » The data analysis used the various forms of data collected from the children and the teacher and focussed on five themes:

1 | Potential change from the child's perspective;
2 | Shifting perceptions from the teacher's perspective;
3 | The development of a culture of meta-learning and self-reflection;
4 | Enabling empowerment; and
5 | Emotions and learning.

Potential change from the children's perspective

« 19 » There were changes noted in the children's perceptions of how they thought the brain worked and in their views on a fixed versus a growth mindset. Initially children saw the brain as something one used to listen, remember and learn but not as something that they could improve. The lessons gave the children the opportunity to see that making mistakes could make the brain stronger and that practice helped, especially where brain connections were weak initially. The teacher believed that the idea of being in charge of their brains was a new one for the children.[3]

Adriana (1): Your brain is for you to think and listen.
Teacher (1): How did basketball get easier?
Adrijus (1): When I was practising.
Sophie (2): Our brains grow when we learn hard things.

« 20 » In the lesson series, the children showed that they understood the idea of growth mindset. They became aware of the role of making mistakes in learning new ideas, they became more confident in trying again if they got something wrong, and they represented creative brains as colourful while fixed-mindset brains were "dead and lazy." The teacher noticed how growth mindset helped some children who were having difficulties and how some encouraged others using growth-mindset ideas when they thought they could not do some task. So, the children were transferring the ideas to other situations as they arose in school.

Pamela (6): Mistakes help me improve.
Fionn (6): Plan A didn't work.
Teacher (interview): [...] the children are learning from what the other children are saying. They are sharing knowledge with each other.

Shifting perceptions from the teacher's perspective

« 21 » The teacher acknowledged her own changing perspectives, particularly in relation to three of the six principles: the challenges and barriers to high expectations, alternatives to ability grouping, and the potential for transforming teacher expectations.

« 22 » The class teacher acknowledged the barriers to having high expectations for all the children in her class, especially before completing the growth-mindset intervention. With such barriers, the class teacher is

3 | The quotes presented were taken from the lesson transcripts and from the teacher interview to illustrate themes. The children's statements are followed by a lesson number (1) indicating the lesson transcript where the statement was recorded and the teacher statements are followed either by a lesson number (1) or by (interview) as appropriate. Note that the theme statements in some cases do not all come from one lesson and the children's statements are not necessarily precise sequences of conversation in a lesson.

at risk of "hierarchical modes of thinking" (Hart et al. 2004: 31), an idea supported by Robert Rosenthal and Lenore Jacobson (1968). According to the teacher, these barriers included perceived family backgrounds and academic levels of the children coming from the previous (first) class. While the teacher's expectations improved for the children, she still retained the idea that the children were at different levels or had different abilities. This highlights how educational discourse has been dominated by the fixed-ability paradigm (Boaler 2013; Keogh & Whyte 2008; Hart et al. 2004; McGillicuddy 2013).

« 23 » As part of the ideology of growth mindset, the researcher wanted the children to embrace challenging themselves, empowering them with a choice and not to be afraid of making mistakes (Dweck 2012; Ricci 2013). So, she set up maths challenges for the children in which they could choose their level themselves and the teacher found this worked quite well. The teacher herself tried using mixed-ability groups as an alternative to ability-based groups but thought that ability groups would not affect them adversely. This is contradicted by previous research in the field that found that ability grouping has a profound effect on children (McGillicuddy 2013; Drudy & Lynch 1993).

« 24 » The class teacher stated that some of the children surprised her by their reactions and actions during the intervention. This is supported by the transformative potential inherent in a belief in malleable intelligence (Hart et al. 2004; Dweck 1999; Swann et al. 2012). This included the higher levels of expectation they had for themselves. The teacher found she was praising the children for effort rather than results, and she became more aware of the language she used to encourage them.

The development of a culture of meta-learning and self-reflection

« 25 » Meta-learning refers to an awareness and understanding of learning itself rather than knowledge about a topic or subject (Biggs 1985). Meta-learning or learning about learning is pertinent to acquiring a growth mindset because a growth mindset promotes approaching new tasks with new strategies (Ricci 2013). It was discussed earlier by Bateson in terms of insight into learning (1972) and is central to his constructivist account of learning. Here it is discussed in three subsections: children's perspectives on increased meta-learning awareness (in the constructivist frame this is deutero-learning), picture-book opportunities to facilitate further understandings, and the teacher's perspectives on the development of a meta-learning culture.

« 26 » Questioning children about skills they had developed, like football,[4] facilitated the emergence of awareness of learning to play football well. During the lesson series the children had chances to reflect on their own learning by looking at tasks already learnt and setting goals for new learning. The children also set their own learning goals. The children showed awareness that implicit in the things they were good at were where they accomplished learning, activities and tasks that they had put effort into and practised. Dweck (1999) refers to this as mastery-oriented learning.

« 27 » The picture books used throughout the lessons provided the children with opportunities to comment on and identify with how the characters improved their skills over time. This is one child's comment on the book *The Dot* concerning artistic skill (from Lesson 7):

Bruce: I also think she had a growth mindset.
Teacher: So, Bruce, do you think she has a growth mindset now?
Bruce: [nods].
Teacher: How?
Bruce: Because she kept trying.

« 28 » The teacher had various insights into the way meta-learning developed. She saw how the children applied growth mindset to other areas of school learning, she became aware of her use of growth-mindset language, and she acknowledged that improvements in motivation to learn could develop an awareness of how to approach new problems. In turn, this could encourage the children to think of themselves as good learners.

« 29 » Empowerment is central to growth-mindset thinking, to enable the children to engage their locus of control (Hart et al. 2004) so they have a voice in the classroom. Meta-learning empowered the children by helping them gain control over their learning and believe in their ability to achieve though applying a growth mindset in practice. When the teacher asked how the children might improve their skills, the answers included finding different ways to do things, trying harder and never giving up. The children's belief in future achievement was clearly expressed in lessons where their responses showed they made the distinction between not being able to do something and not being able to do it "yet." An example from Lesson 6:

Bruce: They both say I can't do this, but the growth mindset says "yet."
Teacher: And why does the growth mindset say "yet"?
Bruce: Because it's in the growth mindset and just because you can't do it now doesn't mean you can't do it ever.

« 30 » Knowledge and application of a growth mindset led towards the children being able to empower themselves practically. The children gave examples of how they told themselves not to give up, and of overcoming and learning from mistakes. The aim is to have the children practise their new learning themselves independently when they come across a challenge. Also, they learned to see challenges as opportunities for personal growth. The empowering aspects for the children were the psychological tools they had within themselves, their own language use surrounding learning, their own expectations of a task and their attitude towards challenge and mistakes. Susan Hart et al. (2004) call these the internal forces on learning that need to be manipulated to encourage positive change. The class teacher acknowledged that through the lessons the children were shown how to empower themselves over their learning. She describes that over the course of the lesson series this transformability was enhanced.

4| In Ireland football is Gaelic Football, which is played with a round ball like soccer, and the ball can be picked up and passed by hand or foot. No tackling is allowed in contrast to rugby or American Football. The game is played in all parts of Ireland. The Gaelic Athletic Association is responsible for competitions https://www.gaa.ie

Teacher (Interview): I think from the very beginning and all the other things throughout the other books and the lessons has allowed them to see that they can enhance their learning, they can take control and try a little bit harder."

Hayden (5): You can do stuff that you can't do and keep doing it and doing it and then you could help other people do stuff and they could keep doing it.

Karl (2): Learn new stuff and when you learn new stuff your brain will grow all the time.

« 31 » In the Interview, the teacher found that the children wanted to learn when they had choices about their work:

Teacher: I feel they want to learn now. They know that they can learn more things, they can practise things that they aren't sure of yet. They can improve by making mistakes. They know they can take control over their own learning.

Emotions and learning

« 32 » In many of the lessons the children had opportunities to discuss learning and the feelings they associated with perceived achievements and failures. Emotions and the children's identities as learners appeared intertwined. This theme is delineated as follows: negative emotions and perceived failure; empathizing with characters in picture books; negative language can affect emotionally; mistakes and worry; feeling smart; growth mindset; and positive emotions.

« 33 » Negative emotions arose regularly in the context of things that the children could not do or understand, when they needed to ask for help and when they made mistakes. When asked about why someone might give up on something quickly and why they might have a fixed mindset, there was an evident link between having a fixed mindset and negative feelings and emotions. This highlights how negative feelings of self-worth regarding learning can stunt growth and damage learning opportunities (Dweck 1999; Hart et al. 2004; Bandura 1986).

« 34 » In Lesson 10, the children made a link between making mistakes and feeling worried and articulated how this could be allayed by applying a growth-mindset perspective:

Teacher: Boys and girls with a growth mindset, would you be worried about getting everything right at school?

Lindsay: No, because mistakes help your brain stretch and grow.

Teacher: How does having a growth mindset make you feel better about school?

Jake: Happy.

Adam: It helps you learn.

Lily M: You won't have to worry about getting one of your questions wrong. Because mistakes help us improve.

« 35 » The class teacher commented on how the children stopped worrying when they were aware that making mistakes was nothing to be afraid of. There was no evidence that the children recognized the link between self-descriptive language and the way you can feel. However, in Lesson 8 the teacher tried to help the children see this link:

Teacher: Is it a good idea for Gerald[5] to call himself useless? Is that a good idea?

[Some children are calling out "no."]

Teacher: How does that word useless make him feel? Would it make him feel good?

Chorally: No.

Teacher: Those words would make him feel bad, they'd make him feel worse.

« 36 » Further on in this lesson the teacher returns to this point to re-enforce how the language we use to describe ourselves is linked to negative emotions:

Teacher: I want to remind you how important the words that we say to ourselves are. If I say to myself I'm useless at something and I can't do it, how does that make me feel? I'll feel useless cos I'm telling myself I'm useless. So I'll feel pretty bad about myself.

« 37 » The children recognized that making mistakes was not something to be afraid of but, as mentioned above (§35), did not recognize immediately the link with the language we use and how that can potentially affect us emotionally.

Padraic (8): Cos he can dance and he's really happy about it. Looking at our statements that we looked at earlier, which one of those do you think Gerald said to himself?

Hayden (6): There's always Plan B.

Conor (4): I can't do this yet.

« 38 » The children empathized with the characters Vashti and Gerald in the picture books *The Dot* and *Giraffes Can't Dance* and so could discuss feelings around learning. Both characters experienced emotional states brought about as they moved from a fixed to a growth mindset. The teacher extended and probed the children on their reasoning about the prevalence of certain emotions. In Lesson 7, the children give their responses to perceived emotions of the character Vashti in the book *The Dot* when she saw the picture she had drawn in a frame:

Freddy: Surprised...

Adam: Probably shocked because in the first place she thought she was a bad drawer.

Kelly: Nervous... Because she probably never saw any of her pictures up like that.

Kevin: Surprised because she just thought it was a useless thing and just a waste of time.

« 39 » The children were also able to articulate how Gerald was feeling when he could not dance, and all the other animals had laughed at him:

Cillian (8): Sad because he looks like he has red on his face.

5| Gerald is the giraffe in the book.

Jake (8): Unhappy and embarrassed.

« 40 » The lessons provided opportunities to reflect on times when the children were feeling smart. This was not confined to school activities and appeared to correlate with being accomplished and achieving something (from Lesson 3):

Teacher: Ok, we're going to think about times when do you feel smart?
Bruce: When I play with my Lego....
Phoebe: When we're at music.
Alex: When I'm doing a front flip on my trampoline...
Patrick P: The stories I was reading.

« 41 » Maths was a common area where the children might feel worried about being smart. This fits into a discourse that maths is hard and the negative feelings that children can hold surrounding mathematics (Boaler 2010). From Lesson 3:

Teacher: Are there any other times that you might worry about being smart at *school*?
Patrick H: Maths....
Kevin: Maybe sometimes when you are doing a maths challenge.
Adam: During maths challenges....
James: Maths cos it is hard sometimes.

« 42 » The children were clear about being happier with a growth mindset because they would know and learn more (from Lesson 5):

Teacher: Do you think you are happier if you have a growth mindset or a fixed mindset?
Patrick H: Growth mindset.
Teacher: Why?
Patrick: Cos you'll learn more.
Jasmine: A growth mindset.
Teacher: Why do you think that?
Jasmine: Because it sounds as if you grow and can know more stuff.

« 43 » In Lesson 8, the children recognized that growth mindset equates with feeling happy and fixed mindset equates with feeling bad as shown here as the teacher questions the children on how Gerald is feeling when he learns to dance:

Teacher: How is he feeling?
Lily M: I think now he has a better brain and a growth mindset.
Patrick H: He feels really, really happy.
Amelia: Happy.
Jasmine: Proud.
Lily G: Excited.
Kevin: Proud.
Jake: Excited, proud and not embarrassed anymore...
Steve: Useful.

« 44 » The teacher expressed the belief that the intervention had had a positive impact on the children's self-esteem, leading to a more positive image of themselves as learners, including overcoming fear and worry surrounding their learning:

Teacher (Interview): I think there are children that were saying in the last few lessons how the growth mindset can help them and help them in their learning. There were a lot of interesting responses to that one about how I'm not afraid, I don't give up now cos I have a growth mindset. So, I can see that is helping them. They are making mistakes, but they are not afraid to make them. They are not worried about that anymore. They know they can improve.
Dan (10): She giggled when she made a mistake and laughed.
Fionn (10): She learned it's good to make mistakes.
Adrijus (10): Cos when you make a mistake you can try again and when you keep trying you learn something new.

« 45 » These positive emotions associated with growth mindset are what Dweck (2015) calls a whole 'psychology' that comes with applying a growth mindset. This includes increased self-esteem and resilience.

Discussion

« 46 » The data from both the children's and the teacher's perspective suggested that the intervention had a perceived positive impact on both the children and the teacher. These changes are characterized as constructivist because they are related to "learning to learn" or meta-learning and also because the opportunities to learn offered in the picture-book stories are centrally concerned with providing the children with moments of reflection on their own experience. This section begins by discussing the impact on the children and then the teacher. The apparent changes that occurred will be critiqued in relation to whether these perceived changes were reliable or superficial. The limitations and strengths of the study will then be presented. Recommendations for educational practice and policy arising out of the findings with support from previous research will be outlined. These include the primacy of beliefs in relation to intelligence, the inextricable links between learning and emotions, pedagogical implications and the links between marginalization within the education system and learning. Finally, recommendations for future research will be presented.

« 47 » The growth-mindset intervention had a positive impact on the children arising from their increased meta-learning skills and their empowering themselves as a result of acquired knowledge about a malleable brain. This was supported by the children's constructions in their discussions, and the effects of these changes on their activities in the lessons, their subsequent actions in the classroom and by the teacher's observations. The children's positive reactions to growth mindset suggested it changed their own expectations of what they could do. This is consistent with Dweck's claim (1999) that growth mindset increases self-efficacy and the motivation to learn. The findings support previous research on how growth mindset can increase empowerment in that children feel that their ability to learn is something they can influence. Hart et al. (2004) call this "the locus of control" that is related to transformability and changes in internal forces needed to bring about change. The findings invite further investigations concerning children's constructions

concerning their ability to learn and achieve linked with Bateson's (1972) ideas about learning.

« 48 » It is noteworthy that these children were seven and eight years old because research has illustrated that developmentally younger children have a broader view of intelligence (Cain & Dweck 1989). Further, the children in the intervention changed their views on their learning capacity across a broad range of activities extending beyond school-based academic subjects.

« 49 » No child is generic, and children's needs vary. More differentiated levels of need are required for positive outcomes in educational interventions (Downes 2014). The teacher, when probed, spoke about individual differences in the children's reactions. Although the children's answers, documents and teacher's observations suggested an overtly positive outcome, some children needed further assistance to enhance their understandings. The teacher commented on the language used as being one such potential obstacle.

« 50 » There was evidence also in relation to children who responded exceptionally well to the growth-mindset intervention. The teacher noted one child who presented initially with low confidence and achievement for whom the intervention had a very positive influence. This is consistent with Dweck's theory (1999, 2015) that children who struggle the most at school respond best to growth mindset. It is her belief that when children with low achievement begin to believe in malleable intelligence, they can be transformed.

« 51 » The perceived impact of the growth-mindset intervention on the teacher is reciprocally related to the impact on the children, as any positive changes in the children are partly determined by the teacher's attitudes, actions, words, expectations and teaching (Hart et al. 2004; Boaler 2006; Dweck 2015). The findings showed how the intervention and the teaching of the lessons had a positive impact on the teacher and she stated how her own expectations for the children were raised and transformed.

« 52 » The teacher however, did still refer in her responses to hints of a fixed model of intelligence when talking about the children's "levels" and "abilities." This highlights the institutional nature of fixed-ability determinism that is part of the fabric of not only educational discourses but also other cultural discourses (Boaler 2013; Keogh & Whyte 2008; Hart et al. 2004; McGillicuddy 2013). This includes references to "mixed – ability" teaching with underlying assumptions about ability (Stobart 2014). This illustrates the cultural and linguistic difficulty of changing the semantics within the educational landscape. It is not just attitudes that need to change but also the language. There is the potential for contradictory messages while advocating growth mindset with explicit messages about malleable intelligence and implicit messages of fixed intelligence.

« 53 » The teacher spoke tellingly regarding her attitude towards ability grouping. The teacher did not believe that ability grouping affected the children emotionally when it was not applied all the time. Previous research on this topic including Deirdre McGillicuddy's Irish study (2013) and research by Sheila Drudy and Kathleen Lynch (1993) contradict this, showing that ability grouping affected children's sense of self and self-worth. Further research is needed into how ability grouping affects children in this age category to see, if ability grouping is not used excessively, whether this lessens any adverse effect on children emotionally. In support of the need for more research on this question, Emer Smyth, Selina McCoy and Gillian Kingston (2015), in their evaluation of DEIS, commented on the scant amount of Irish research into the effects of ability grouping at primary schools.

« 54 » It was clear from the teacher's responses that her expectations were raised for the children and that this change in perception led to surprisingly good responses from the children. The significance of teachers' expectations and how they can lead to shifting perceptions, potential change and higher performances is supported by previous research (Rosenthal & Jacobson 1968; Hart et al. 2004). The findings have shown that the teacher played an integral role in enabling the children to experience change through adhering to the guiding principles of the ideology of growth mindset and also teaching the children practically about a malleable brain. The importance of what a teacher says and does, matters (Hart et al. 2004; Dweck 1999; Swann et al. 2012; Gillborn & Youdell 2000).

« 55 » It is justified to question whether perceived change resulting from the intervention in both the children and the teacher was reliable or superficial. Expectations, motivation, feelings and confidence are not easily measurable. The qualitative lived experience of the children and their authentic responses and actions in the classroom can tell us about whether the change was reliable. There was a risk that the children and the teacher responded with what they thought the teacher or the researcher wanted to hear (Cohen, Manion & Morrison 2011). To know whether the concept and ideology are firmly embedded, it will be necessary to return to the same children at a later time to assess the concept of growth mindset again. For authentic change to occur, the teacher, too, would need to take on the guiding principles as a philosophy of teaching and continue to emphasize the concepts of growth mindset, not just for the short period of time over the course of this study. A similar study over a longer period of time would provide information concerning whether such changes are durable.

« 56 » There are recommendations for educational practice. The beliefs people construct determine their experience of their worlds and the way they think, feel and behave. That is why teachers' beliefs about intelligence matter, as they influence the way they teach. For the intervention to be successful, teachers need to believe in the guiding principles. In this study, while the teacher agreed to take on the underlying guiding principles it might be argued that the belief may not have been strong enough to be effective (Hart et al. 2004). Daryl Bem's theory of self-perception states that if behaviour changes, then values and beliefs will also change (Bem 1967). Accordingly, if a change occurs in the behaviour of the teacher in advocating growth mindset, a subsequent shift in values and beliefs can follow. It would be most interesting to follow up on these ideas within a strong constructivist experimental framework in classrooms. To what extent, for example, are the changes in children's thinking long-lasting?

« 57 » Beliefs concerning the nature of intelligence have been shown to be significant for children's success and failure at school. There is a need, therefore, for the relevance of beliefs surrounding intelligence

and abilities to be considered by teachers in schools and by students preparing to be teachers. While more progressive theories of intelligence are often part of educational thinking in schools and teacher education centres, the fixed-ability mindset needs to be challenged.

« 58 » Erich Fromm argued that emotions have been discouraged in our society and we can see how the place of social and emotional learning within the education system illuminates this lack of emphasis. The placing of emotions in a central position in the education system is needed to counteract this lack (Fromm 1960; Galbraith 1992; Laing 1967). Social and emotional learning in schools and the emotional supports available to children have been largely neglected in the Irish education system (O'Brien & Flynn 2007; Downes 2011). Paul Downes (2011) argued for the engagement of pupils' emotional needs. The findings in this study emphasized the importance of emotions in relation to learning and how emotions and learning are inextricably linked, especially in relation to the perceived success and failure surrounding learning.

« 59 » The children did not always elaborate on emotions and feelings. Instead they most often just named the emotion. This may point towards a lack of emotional development of the children who took part in this study, or more simply indicate their lack of experience talking about their feelings. Teachers need to be aware of how feelings and learning are intertwined and the reciprocity between the two. Interestingly, in the study the teacher said she needed to explain how using negative language can affect us emotionally when they were discussing the character Gerald in the book *Giraffes Can't Dance*. This highlights further the need to develop children's emotional literacy.

« 60 » The results show how having a growth mindset released the children from the worry about getting things right and also from the need to look smart to their peers. This was apparent in this comment: "I felt stupid and embarrassed to ask my friend for help." Comments like this show how teachers need to reflect on how significant feelings are for learning and how feelings of worry, unease and embarrassment contribute to school failure. Growth mindset has shown that it can alleviate some of these emotional issues and could successfully form part of a school's emotional policy.

« 61 » The findings of this study support previous research on learning and performance goals. Adherence to a fixed mindset has been associated with competitive performance goals while flexible learning goals have been linked with a growth mindset. Learning goals have been shown to lead to deeper student satisfaction and a sense of fulfilment with their school work (Dweck 1999; Dweck & Leggett 1988). Therefore, the types of pedagogical goals emphasized are important. Growth mindset advocates a shift in emphasis to learning goals from performance goals. Benjamin Bloom (1968) introduced the idea of mastery learning, which relies on specifying learning goals that learners master before moving on to the next topic. There is a marked difference between each type of goal; one focuses on measuring oneself against a performance standard and the other is about mastering new things (Dweck 1999). As illustrated, the children in the intervention responded positively to developing learning goals and were given the space to develop meta-learning skills. It is these meta-learning skills that link constructivist approaches with growth mindset.

« 62 » Dweck and Elaine Elliot (1983) have shown that students with performance goals are much more likely to be vulnerable as there is too much emphasis on abilities as a stable and uncontrollable factor. There is not an inherent or underlying problem with performance goals in and of themselves. When you believe in the theory of malleable and incremental intelligence, a performance goal or a test only ever assesses specific knowledge at a specific time (Dweck 1999). This is in contrast to someone who believes in a fixed theory of intelligence for whom the same test is given paramount importance as it tests overall intelligence.

« 63 » The practical pedagogical recommendation for teachers from this study is to teach and believe in growth mindset as it can instil a love of learning in children. A love of learning can equip children to overcome obstacles and face challenges. Dweck (1999) calls these "mastery-orientated" qualities inherent within a growth mindset. Smartness is then not measured by the results of a test or any other performance goal. Rather, it is "engaging fully with new tasks, exerting effort to master something and stretching skills" (ibid: 4). These pedagogical approaches can support an inclusive classroom where the focus is not on performance but on learning. The teacher in the intervention spoke about how the children had increased motivation and faced challenges more readily when embracing a growth mindset where the focus was on the learning and not the performance. Growth mindset, in this regard, can be a buffer against the emphasis on performance brought by the increasing reverence towards standardized testing. These recommendations show how learning to learn can be achieved, so altering children's views of themselves and of their capacity to achieve in school. Following Glasser (1986), this is a way of helping children understand learning is possible and school can be positive.

« 64 » As a final word on the effects of the process on the two teachers involved, informal enquiry showed that the class teacher found the class materials useful and used them in the following year. In addition, the first author continues to avoid the language of ability in her new role helping children with reading difficulties so as to facilitate their self-belief.

Conclusion

« 65 » This study emphasizes the potential of growth mindset in preventing children becoming marginalized in school. This is of particular relevance when working in a DEIS school, where the children are at a higher risk of becoming socially excluded from the education system. It is, therefore, important for policy makers in preventing early school leaving. Although there are many supports that are needed at schools to prevent early school leaving, including emotional supports (Downes 2011), the role of pedagogical approaches to learning cannot be ignored. These approaches can determine a child's perception of school success and school failure. Negative experiences could influence early school leaving.

« 66 » Learning within a fixed-entity model of intelligence can lead to deficit labels, explicitly and implicitly. Children's negative feelings and worries about school

achievement need to be addressed. The findings showed how young children worried about mistakes and getting things right. The children experienced empowerment over their own learning as a result of being taught growth mindset. This renewed motivation can be assumed to help to alleviate early apathy and disaffection from learning and school. While the DEIS policy emphasizes learner-centred learning and increasing pupils' potential, it does not contain any guidance on the importance of value systems concerning children's intelligence and the potential role this plays in keeping children at school. Neither does DEIS policy convey the message that all children can learn without limits. This study indicates how learning to learn can be central in providing a way for children to construct more positive representations of their capacity to learn and to achieve in school. This is promising and indicates the potential for following up and engaging with children in a constructivist experimental framework to provide and assess experiences that enable children to adjust their thinking about their schooling. Such a study might focus on learning to learn and how this led to constructing ideas about themselves that empower them as learners who are confident that they can engage with the educational process. Part of this is helping children to find ways of solving problems they experience as difficult, so that they experience learning positively.

« 67 » There is a danger in the recent focus on quantification and measurable targets.[6] There are gaps in this new DEIS policy in this regard. Downes warns against this "drive towards metrics" (Downes 2017: 47) as it is an antithesis of a living organic educational system. Keeping children interested in learning is essential and cannot be assumed, particularly if an idea of fixed intelligence pervades in teachers' thinking in primary schools. Experiences of failure at school and how they can affect children cannot be ignored. Increasing self-esteem is not sufficient and telling children how smart they are is not sufficient if they live in a fixed-intelligence context (Dweck 1999). A testing preoccupation and increasingly measuring children against each other are very much within this fixed-entity model. When children continually experience failure in this model, they become increasingly helpless. Dweck (1999) points out that this develops vulnerabilities rather than fostering resilience. Within this context, inevitably the child will not be able to cope well with setbacks and challenges. Setbacks and challenges are inevitable and arguably will worsen as children go into post-primary schools where according to Lynch, "competitive individualism is an endemic part of life" (Lynch 1989: 87). This does not auger well for encouraging vulnerable children to see school as important and to become lifelong learners. This article is about changing children's representations of learning and constructivism, so is interdisciplinary. Growth mindset in this article refers to six principles: empowerment, praise, trust, co-agency, choice and alternatives to ability grouping. (Radical) constructivist approaches to learning emphasize the central role of the learner in her capacity to change her thinking about her experiences. In education, success depends on finding or creating solutions to all sorts of problems. Self-belief in one's capacity to do this depends in part on one's past success and also on one's self-concept. In constructivist terms, this link between success and belief might be put this way: "knowledge is best conceived as arising in experience and is fundamental to belief" (Riegler 2015: 484).

« 68 » Growth mindset emphasizes helping children form a positive attitude to learning and being persistent when they have difficulty learning. However, growth mindset comes from Bandura's social learning theory. In contrast, (radical) constructivism emphasizes the idea that sense-making is vital to schooling and that personal constructs include learning to learn. At present, they seem like quite different approaches to enabling children struggling to find viable learning strategies. Yet each emphasizes a classroom ethos of mutual respect with trust and co-agency that facilitates an openness to experience allowing learning to flourish. It seems to us that constructivist educational research could fruitfully include an examination of changes in children's capacity to learn. Growth mindset and (radical) constructivism each have important perspectives on learning that can act as safeguards for marginalized children and children who are socio-economically excluded from the education system in this regard (Claro, Paunesku & Dweck 2016). We hope this study will lead to further work on learning to learn in classrooms within a (radical) constructivist framework.

6| DEIS plan 2017: Delivering equality of opportunity in schools. Department of Education and Skills, Republic of Ireland. https://www.education.ie/en/Publications/Policy-Reports/DEIS-Plan-2017.pdf

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