

Paper Title

Embedding strategies to support students' growth mindset attitude towards '*making mistakes*' in first year visual communication course

Author

Dr Gerhard Bachfischer

Affiliation

University of Technology Sydney, Faculty of Design Architecture and Building, Ultimo NSW 2007, Australia.

Full Contact Details

Dr Gerhard Bachfischer

Senior Lecturer

Tel: +61 (0)2 9514 8971

gerhard.bachfischer@uts.edu.au

University of Technology Sydney, Faculty of Design Architecture and Building / School of Design, Ultimo NSW 2007, Australia

Biographical Details

Gerhard Bachfischer is an Austrian-born typographer / designer / lecturer / academic with over 30 years of experience in design education, around half of it from Austria, and half from Australia. He is currently a senior lecturer in the Visual Communication Undergraduate Degree in the School of Design at University of Technology Sydney (UTS). He most enjoys teaching typography in a large core subject called Text & Image. Gerhard completed his doctorate, "Framework of Influential Factors on the Typographic Quality of Text Perceived by its Audience", in 2009 at UTS. He also holds a Master's Degree in Interactive Multimedia from UTS. His main research interests include design practice and education in particular typographic education.

Embedding strategies to support students' growth mindset attitude towards 'making mistakes' in first year visual communication course

Keywords: growth mindset, making mistakes, design process

Abstract

This paper focuses on developing growth mindset attitudes in first year design students. A successful design process is built on practice, struggles, growth, mistakes, and failures; a growth mindset influences students' positive attitudes and approaches towards those building blocks of successful design. It is not only necessary for a seamless transition into higher degree design courses but also fundamental for students' ongoing learning success within their degree and their professional practice after exiting university. This study looks for effective strategies that can be embedded in courses to help first year students develop and cultivate a growth mindset. It may seem that design students can absorb the culture of such key elements to success - making mistakes and seeing them as a positive stepping-stone towards their own mastery - from their lecturers, studio teachers and tutors. However, many students in their first year design degree, when asked about their attitudes towards setbacks in our exploratory study, indicated that they view struggle as an indication of *"not belonging"*, challenges as a sign of *"not being good enough"*, and efforts as *"something for people without natural talent"*. As such mindsets are likely to hinder success, it is essential that we do better to embed a design culture in our students' education that thrives on learning from mistakes and struggles. Carol Dweck's (2006) research on the psychology of mindsets and motivation provides an important foundation in this study, shedding light on why and how widespread such limiting attitudes are.

Introduction

A successful design process is built on practice, struggles, growth, mistakes, and failures. This is most evident when looking at successful design careers, and attitudes of successful designers behind those careers. James Victore, a successful New York designer who has won numerous awards and whose work has been exhibited at the Museum of Modern Art (MoMa) in New York has commented on 'failing' in Adobe's Create Magazine; he explains that *"Failure has a job to do. [...] it pushes ideas forward and forces you to grow"* (Victore, 2014). Similarly, Paula Scher, a long standing principal of the international design consultancy Pentagram, states (Scher, n.d.): *"It's through mistakes that you actually can grow. You have to get bad*

in order to get good.” Stefan Sagmeister, well known for his work for the American Institute of Graphic Arts (AIGA) and countless international music stars like The Rolling Stones, David Byrne or Aerosmith, addresses his fear of making mistakes in a talk for Berghs School of Communication *“especially as a student [...] it is important to embrace failure”* (Sagmeister, 2011).

If these attitudes are evident among practicing designers, the question opens up whether this is reflected in design education. Are students in design aware and prepared by their institutions to accept ‘making mistakes’ and ‘failing’ as part of becoming successful designers? Furthermore, are we, as educators, helping students to get better at ‘failing’? Can the above - the positive attitude towards mistakes, struggle and failure - be better integrated into design education, and if so, how?

Background

With these questions in mind, we looked at what the literature offers about how people deal with mistakes and failures in general, and how these dealings are resolved in education - in particular, higher design education. Carol Dweck’s ‘Growth Mindset Theory’ (Dweck, 2006) has provided important insights. Dweck, a psychologist at Stanford University, and her colleagues discovered that people differ in how they handle struggles, mistakes, and failures based on their beliefs how abilities are developed. People, Dweck (2006) explains, who believe abilities are predetermined, mostly based on inborn talents or “deep-seated traits”, are said to hold fixed-mindset views. On the other hand, people who believe abilities can be developed with practice and hard work are said to hold a growth mindset. While the question whether human qualities can be developed or are carved in stone is an old one (Dweck, 2006), an understanding what those beliefs can mean for individuals is new: people with fixed and growth mindsets, for instance, deal with mistakes, struggles, and feedback very differently (Dweck, 2006):

A **struggle** in a growth-mindset view is a setback that can be overcome given sufficient effort and useful strategies, while in a fixed mindset, a struggle is a sign of a lack of ability (*“I can’t do it”*) compared to the growth mindset mantra of *“I can’t do it YET”*. In a study at the University of Hong Kong (Dweck, 2006), arriving students who were likely to have difficulty with their study language, English, were asked if they would take a class that would offer improved English skills as well as questions to determine a growth mindset or a fixed mindset attitude. Dweck (2006, p18) reports

that “*students with the growth mindset said an emphatic yes. But those with the fixed mindset were not very interested.*” Fixed mindset students will avoid challenging learning activities to avoid confronting or displaying their lack of ability while growth mindset students will welcome such activities.

In regards to **mistakes**, Dweck’s mindset theory suggests that growth mindset holders see mistakes as learning opportunities. By learning from mistakes, they can improve abilities, while fixed mindset holders avoid challenging material that can lead to mistakes to protect their self-esteem. Self-esteem based on a fixed mindset is defined by natural abilities and inborn talents that need to be constantly proven.

Finally, in regards to **feedback**, a growth mindset leads to openness to constructive feedback, which is seen as a learning tool, a means to improve; a fixed mindset will avoid or ignore feedback, which is seen as an attack on a given natural ability. In a study by Mangels, Butterfield, Lamb, Good, and Dweck (2006), growth mindsets and fixed mindsets showed a very different electroencephalography (EEG) brainwave patterns while answering hard questions and getting feedback. People with fixed mindsets showed interest only when the feedback reflected on their ability - when they were told if they answered right or wrong. When they received information how to improve or when they learned what the right answer was if they got something wrong, they did not show any measurable interest. On the other hand, participants with a growth mindset paid close attention to information that could support their learning.

Many of the above growth-mindset traits (attitudes towards struggles, mistakes and feedback) are important in design practice, as discussed earlier, and, therefore Carol Dweck’s (2006) research on the psychology of mindsets provides an important foundation for the study undertaken.

Study Aims

Our overall project of studying mindsets in design education has two aims. If growth mindsets indeed are so helpful when dealing with struggles, mistakes and feedback, which are at the core of a successful design practice as indicated earlier with the examples of successful designers - the first aim is to:

- a) determine current mindsets of design students and understand how many have a fixed or a growth mindset, including mindsets towards specific skills and abilities.

This first aim is the main focus of this paper and is reported in the results discussion below. The second aim, in our further study, is to:

- b) develop strategies to support and enhance what can be done to nurture students' more beneficial mindsets towards becoming successful designers.

Both aims are part of the larger study currently undertaken at the visual design undergraduate degree course at the University of Technology Sydney.

Literature Review

Most growth mindset research in education focuses on primary and high school students (Sarrasin et al., 2018). While there are some studies in higher education, for instance in areas like programming (Cutts et al., 2010), statistics (Aditomo, 2015), engineering (Magno, 2012), biology (Dai & Cromley, 2014) or similar areas, these studies mostly focus on the effect mindsets have on students' grades. In art and design, to the best of our knowledge, there has only been one growth mindset study in higher education (Larsen, 2018). The study by Larsen (2018) reports on a specially designed course with 18 arts and design students, employing mindfulness and active reflection activities over the 8-week-long course. The results were closely monitored and a moderate (statistically significant) reduction in students' fixed mindsets was found after the course.

Study Design

In 2017 we designed an in-class survey that was targeted towards our first year cohort of visual communication students to measure their growth mindset attitudes. In a set of 8 growth-mindset statements measured on a 5-point Likert scale, from "strongly agree" to "strongly disagree", students had the opportunity to choose their answers after having already experienced their degree for about one and a half semesters. Overall, 72 students participated in this first study in 2017. In 2018, the survey was repeated in orientation week with the new first-year cohort. This time, 118 students participated and again the participants responded to a set of 8 growth-mindset statements which were measured on a 5-point Likert scale from "strongly agree" to "strongly disagree".

| | |
|---|--------------------------------|
| 2017: 72 first year student participants | In-class online survey |
| 2018: 118 first year student participants | orientation week online survey |

Figure 1: Study participation and data collection method

Results and Discussion

Results to one of the growth mindset statements in the survey are shown in Figure 2 (“Some students are naturally talented in some areas, but will NEVER be good at others, e.g. drawing, writing, technical skills, or creative thinking.”) The outcome shows that 21.2% of the participants agree (or strongly agree) with this very fixed-mindset view in 2018 orientation week, which is comparable with the 2017 mid-year outcome of 19%.

While not a majority, still one fifth of students starting the visual communication degree believe that some “*will NEVER be good at [some areas of study]*”. For this one fifth of the students, the concept of ‘practice’ when applied to skills they do not already possess takes on a different meaning: why practice if you will never be good at it anyways?

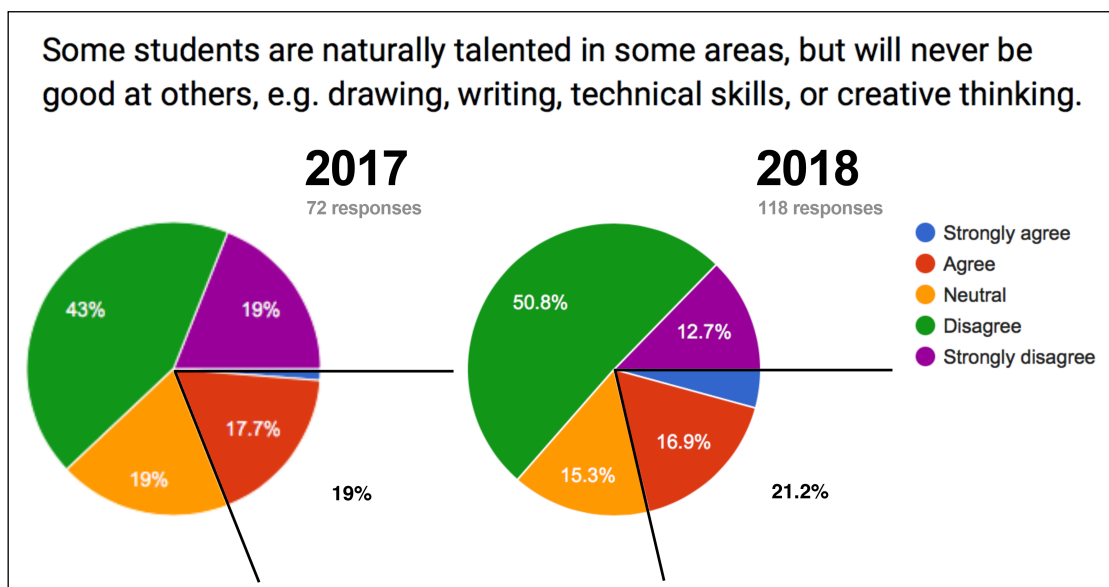


Figure 2

Another statement that according to Dweck indicates a fixed mindset is the following (Figure 3): “If you put a lot of effort and time into practice, and still don’t do well in a task, it just proves that you are NEVER going to be good at it.” In 2018, 23.7% of

starting first-year student participants strongly disagreed, and overall about 84.7% disagreed and strongly disagreed. Interestingly, participants in 2017 also mostly disagreed, but less so: only 74.7%.

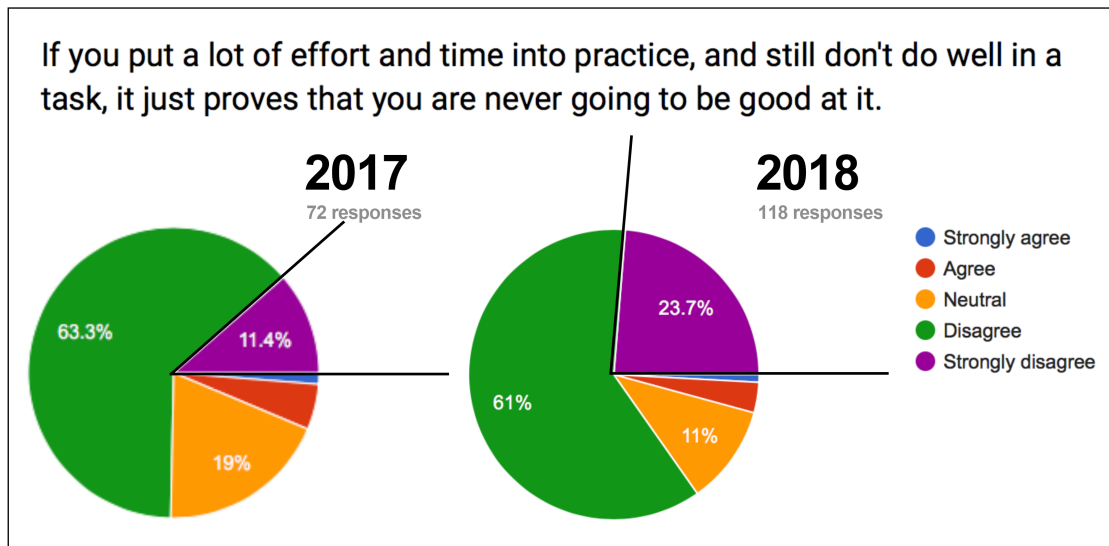


Figure 3

While this does not indicate a change over time (these were not the same students measured at different times), it does point towards further investigation: if university experience does not help decrease the fixed mindset attitudes, does it actually contribute to an increase of fixed mindsets after students have faced their first year at university?

The reasons why practice may sometimes not lead to improvement in ability is explained by Dweck (2006) as follows: it possibly happens because students are not using the right strategies to practice. It is not just about time and effort but what *kind* of effort is used: it's about *useful* strategies that are likely to help students improve, and this is where educators come in to provide guidance and feedback. It is also called *expert practice* in a supportive environment which we are all hoping our institutions provide.

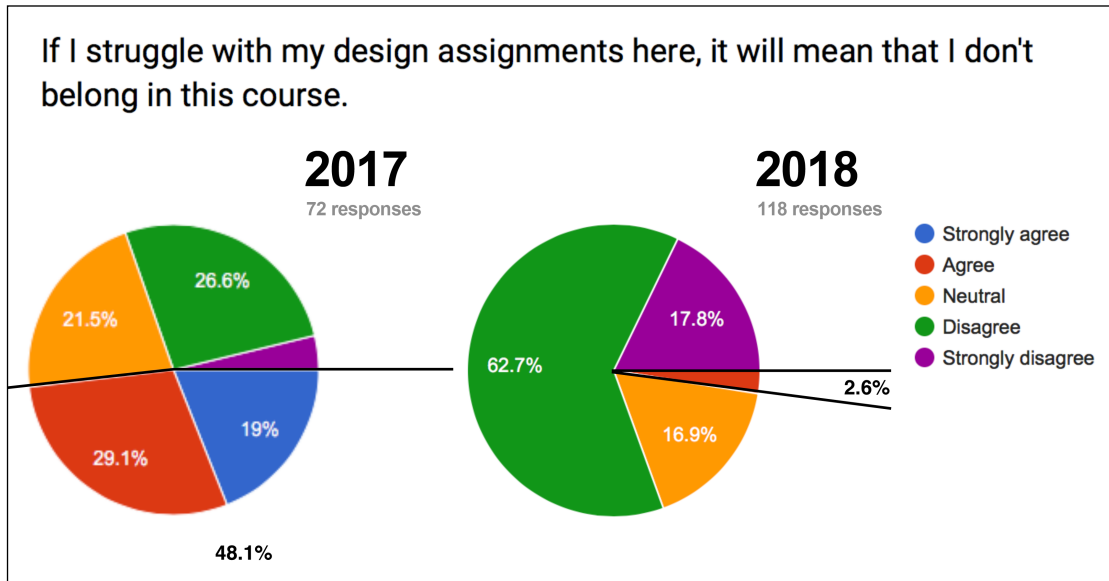


Figure 4

The next fixed mindset statement was even a bigger surprise (Figure 4). It deals with the concept of 'struggle': *"If I struggle with my design assignments here, it will mean that I don't belong in this course."* Only 2.6% of the 2018 participants agreed or strongly agreed with this statement asked at a time when they were starting their degree (in orientation week). The answers of 2017 students towards the end of their first year showed a very different picture: this time, 48.1% of participants agreed with the same statement that struggle with design assignments indicate that they do not belong in this degree. Until struggles - including making mistakes and overcoming obstacles - become accepted necessities towards mastery, such struggles will be seen as a sign of failure, rather than an indicator of successful learning.

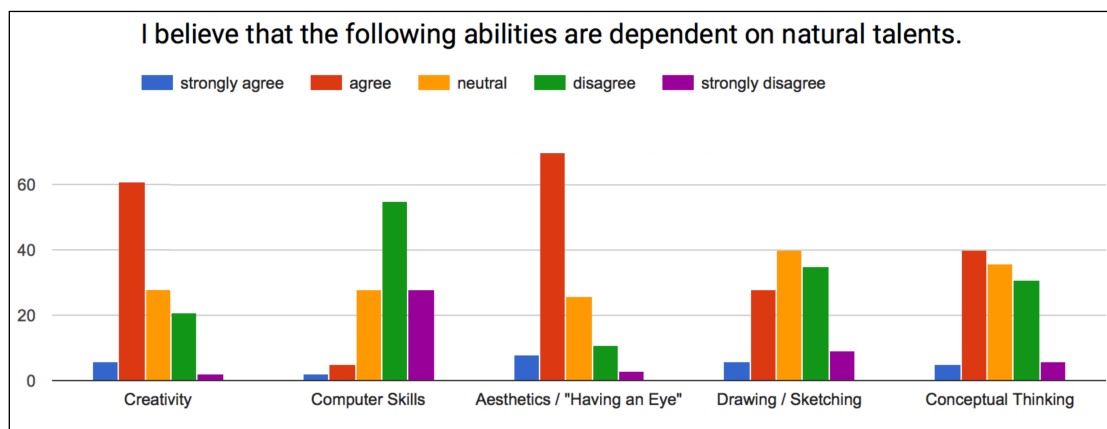


Figure 5

Another very interesting finding was concerned with different abilities and the specific mindsets attached to them as seen in design-focused degrees. The five areas we were looking at were “*creativity*”, “*computer skills*”, “*aesthetics*” as in “*having an eye*” when generating outcomes, “*drawing/sketching*” and “*conceptual thinking*”. These are areas often core to design assignments marking criteria in our institution, and likely in others (Davies, 2003), and, therefore, focus of teaching efforts in a visual design degree. Looking at the combined outcomes from 2017 and 2018 in the area of “*computer skills*”, we see a very good growth-mindset distribution: very few students (the blue and red bars) who agree with “*being good at computer skills is dependent on natural talent*” but most students (the green and purple bars) disagree. It is obvious to them that “*computer skills*” can be learned, practiced and, therefore, can be improved on. For “*drawing/sketching*” and “*conceptual thinking*” we see a similar distribution for fixed and growth-mindset views. However, “*creativity*” and “*aesthetics*” seem to have lot of fixed-mindset views associated with them. This can be a problem because if students think that “*being creative*” and producing work that is “*aesthetically*” appropriate or pleasing depends on natural talent, do they really believe in practice?

Going back to the relationship between a fixed mindset and the ability to accept feedback (Mangels et. al., 2006), it becomes clear that negative feedback for an assignment referring to “*creativity*” and “*aesthetics*” is likely to be seen as a threat to self-perceptions regarding these abilities (Molden & Dweck, 2006): “I’m not a creative person”; “I will never be good at this, having an eye as those other students” etc. On the other hand, growth mindset students would look in the feedback for strategies to improve, or they would ask for additional strategies to improve an ability they believe can be improved through professional practice and repeated effort: “how can I develop a better eye?”; “how can I improve?”; “what can I do to be more creative?”.

Conclusion And Future Research

While this paper has focused on the first aim of the larger project of studying mindsets in design education - ‘determining current mindsets of design students and understanding how many have a fixed or a growth mindset, including mindsets towards specific skills and abilities’, the outcomes indicate that there are more efforts needed to develop design students’ growth mindsets, which in turn are beneficial for their development into successful designers. Seeing that there are still many fixed

mindset beliefs among design students, the question to ask is if and how we can develop strategies to enhance design students' growth mindsets.

Currently we are trialling different strategies with our first-year cohort based on literature to develop student's growth mindsets. We have not evaluated those strategies properly yet but are planning to do that next year in a longitudinal study setup with comparative groups. Students' growth mindsets will be measured at the beginning and end of a teaching period between tutorial groups which will undertake ongoing growth mindset interventions and exercises, and those which will not.

The following is a list of such strategies that have already been evaluated in the literature, for example by Yaeger et al. (2016):

The main strategy - one that has been very well established - is directly teaching students growth mindset theory in lectures or in workshops. In it we present latest neuroscience findings about learning. The content includes but is not limited to:

- neuroplasticity, for instance, how our brains learn and through activity continuously grow (rather than having inborn, unchangeable abilities);
- quotes from admired designers about how they became good at what they do;
- case studies from older students and their successful improvements;
- activities such as, for example, 'writing of an encouraging letter to a struggling friend', which helps students internalise growth mindset messages, or working through a student's personal learning experience, which makes them realise that they are good at something *because of practice*.

Many institutions conduct such growth mindset interventions and workshops but research shows that this has to be supported by teachers' growth mindset language in everyday interactions with students, especially when giving feedback. An example of growth mindset feedback can be avoiding language like "*you are very creative*", but rather saying "*you have made great creative use of trying out X or Y*", and in addition giving specific and realistic strategies on how to improve. Growth mindset thinking needs to be also embedded in studio activities, for example, for developing a particular aesthetic we can suggest deconstructing examples the student really likes and analysing their pleasing or successful features.

Normalising mistakes is another in-class strategy that can lead to embracing them and realising how much can be learned from them. This can include putting mistakes (ideas or implementations that did not work) in the centre of attention by nominating and discussing the 'mistake of the week' to learn together from. For instance, on many occasions educators show students some perfect examples of outcomes, where students do not see any of the struggles on the way, or the mistakes that led to the seemingly 'effortless great result'. Focusing on the pathway to a successful outcome - be it a design outcome or an outcome in terms of a great contemporary designer - could help to reveal the invisible hard work and struggle underpinning success.

What we have been trialling this year, for instance, is an Instagram feed of work in progress during classes. Studio teachers post images of work in progress onto our shared Instagram account for students in the subject to look at. Less developed work can be brought to everyone's attention, and the struggles and mistakes become part of the process.

This research hopes to develop and evaluate many strategies that will help nurture helpful growth mindset attitudes among design students that are necessary for their future successful practice, built on struggles, mistakes, and feedback.

References

- ADITOMO, A., 2015, 'Students' Response to Academic Setback: 'Growth Mindset' as a Buffer Against Demotivation', *International Journal of Educational Psychology*, 4(2), p198
- BOELER, J., 2015, 'Mathematical Mindsets - Unleashing Students' Potential through Creative Math, Inspiring Messages and Innovative Teaching', Jossey Bass, San Francisco/CA/US
- CUTTS, Q. et al., 2010, 'Manipulating mindset to positively influence introductory programming performance', *Proceedings of the 41st ACM technical symposium on Computer science education - SIGCSE '10*; retrieved 20. Sept. 2018
<<http://dx.doi.org/10.1145/1734263.1734409>>
- DAI, T. & CROMLEY, J. G., 2014, 'Changes in implicit theories of ability in biology and dropout from STEM majors: A latent growth curve approach', *Contemporary Educational Psychology*, 39(3), pp233-247; retrieved 20. Sept. 2018
<<http://dx.doi.org/10.1016/j.cedpsych.2014.06.003>>
- DAVIES, A., 2003, 'Writing Learning Outcomes and Assessment Criteria in Art and Design', , <http://www.arts.ac.uk/docs/cltd_learningoutcomes.pdf> retrieved 6. Sept. 2007
- DWECK, C. S., 2006, 'Mindset', Robinson, London/UK
- FORSYTHE, A. & JOHNSON, S., 2016, 'Thanks, but no-thanks for the feedback'. *Assessment & Evaluation in Higher Education*, 42(6), pp850-859; retrieved 20. Sept. 2018 <<http://dx.doi.org/10.1080/02602938.2016.1202190>>
- LARSEN, M., 2018, 'The Failure Project: Self-Efficacy, Mindset, Grit and Navigating Perceived Failures in Design and the Arts', doctoral thesis in Education, Arizona State University, May 2018
- MAGNO, C., 2012, 'Implicit theories of intelligence, achievement goal orientation, and academic achievement of engineering students', *The International Journal of Research and Review*, 9, p32-43
- MANGELS, J. A., BUTTERFIELD, B., LAMB, J., GOOD, C. D. & DWECK, C. S., 2006, 'Why do beliefs about intelligence influence learning success? A social-cognitive-neuroscience model', *Social, Cognitive, and Affective Neuroscience*, 1, pp75-86
- MOLDEN D. C., DWECK C.S., 2006, 'Finding 'meaning' in psychology: a lay theories approach to self-regulation, social perception, and social development'. *American Psychologist*, 61, pp192-203
- SARRASIN J. B. et al., 2018, 'Effects of teaching the concept of neuroplasticity to induce a growth mindset on motivation, achievement, and brain activity: A meta-

analysis'; Trends in Neuroscience and Education, 12, Sep.2018, pp22-31; retrieved 14. Oct. 2018 <<https://doi.org/10.1016/j.tine.2018.07.003>>

SAGMEISTER, S. 2011, Berghs School of Communication: 'Fear of Failure', viewed 21. Oct. 2018 <<https://99designs.com.au/blog/creative-inspiration/10-famous-design-quotes/>>

SCHER, P., n.d., 99design '17 famous graphic design quotes', retrieved 21. Oct. 2018 <<https://adage.com/creativity/work/fear-failure-stefan-sagmeister/23247>>

VICTORE, J., 2014, 'Fail', online Adobe Create Magazine, retrieved 22. Oct. 2018, <<https://create.adobe.com/2014/6/9/fail.html>>

YAEGER, D. S. et al, 2016, 'Using design thinking to improve psychological interventions: The case of the growth mindset during the transition to high school', Journal of Educational Psychology, 108, pp374–391; retrieved 20. Sept. 2018 <<dx.doi.org/10.1037/edu0000098>>