

### Problem

The majority of students in design education lack the necessary drawing abilities in order to transform ideas into representations

### Aim

To investigate the factors that inhibit the ability to draw and compromise the design experience for students in design related programmes

### Question

Are psychological and contextual factors, other than cognitive, responsible for inhibiting the students' drawing ability?

### Hypothesis

Motivational drives, emotional responses, socio-cultural influences, in addition to cognitive and motor capabilities, inhibit the ability to draw and influence the students' drawing/design experience

### Model

The present model represents the conceptual foundation of this research and serves as an instrument to analyse the interaction of different domains - cognitive, psychomotor, psychologic, contextual - and to disclose all the realities of the drawing ability

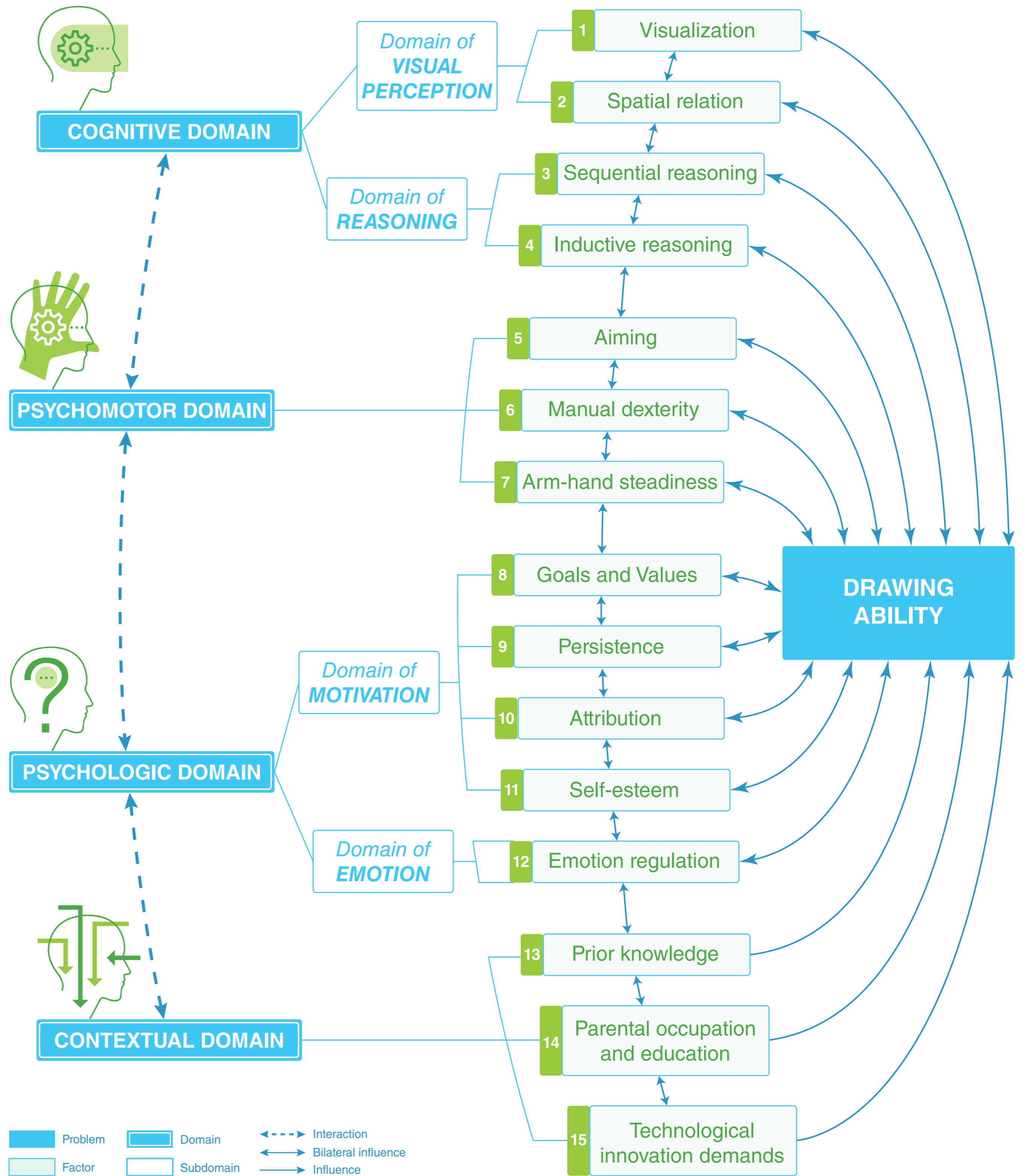
### Model assessment

**Who** First year undergraduate students in design related programmes at East Midlands universities

**How** Three batteries of drawing tests, observations, group and individual interviews

**When** January-May 2020

### Graphical model



■ Problem    ■ Domain    ↔ Interaction  
■ Factor    ■ Subdomain    ↔ Bilateral influence  
→ Influence

### Model description

Each factor is accompanied by a student's voice that reflects thoughts and feelings (concealed or disclosed) of the drawing experience. The set of experiences represents the worst scenario that would be caused by the negative influence of the factors on the ability to draw.

Capability to visualise and transform objects in the imagery space of the mind	1,2		"My design idea is clear in my mind, but I cannot visualise it completely... I want to transform it, but my mind just can't do it."
Capability to elaborate a reasoning through the right sequence of processes in order to reach the appropriate conclusion	3		"In order to draw a section of this object I need to cut here and look toward this direction. Then, the section plan intersects the object here, so I will draw ..."
Capability to infer the task's solution by analysing similarities or contrasts of a given pattern	4		"These drawings represent similar objects; they are rotated by different angles. Do they represent the same object?! Mh... I should first analyse each rotation and ..."
Capability to carry out quick and precise movement while drawing	4		"I am not able to draw clear and straight lines... they look like shaking lines."
Capability to manipulate objects and/or instruments	6		"I can't coordinate the movement of pencil and set-squares at the same time."
Capability to control muscular movements of hand and arm	7		"The pressure that my hand applies to the pencil is too much, it's hard to control it."
Students's goals and values that drive their personal and educational development	8		"My main goal is to reach the end of this course whatever is the quality of my drawings."
Students' value of effort and risk	9		"If I can't draw well, it doesn't have any sense putting effort on it."
Students' explanations for their difficulties	10		"If I failed, this means that I am just not good at drawing."
Students' perception of the degree of their qualities	11		"When I fail to draw something, I become discouraged and I want to give up."
Students' bad feelings and lack of confidence	12		"These drawings are too difficult to realize. I don't know if I'll be able to communicate my design through an appropriate representation... It's unlikely that I'll pass this course."
Students' educational background	13		"I am not so good at drawing because I haven't received an appropriate preparation for this subject in high school."
Family dynamics and beliefs that influence the students' educational development	14		"My familiar dynamics haven't contributed so much to my drawing development."
Influence of society advances on students' beliefs	15		"It doesn't mind if I can't draw, the computer will do it for me."

### Informing Inspiring

The communication of the findings will engage students and educators in a constructive dialogue such to create a set of pedagogical strategies as prevention of negative learning outcomes from the drawing/design experience

### Consulting Collaborating

Which type of scenario would the model reveal with a sample of international students?

International collaborations would enhance the external validity of the findings and develop mutually beneficial relationships that could contribute to a more nuanced understanding of the drawing ability and its influence on the design experience

### Consulting

Could the model be applied to the investigation of other academic abilities?

Dialogues among different academic fields could extend the range of applicability of the present model. They could create synergy and encourage ways of addressing similar research questions within the disciplines of Foreign language and Mathematics for instance, building new knowledge and deriving implications that would not be otherwise possible