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Engineering design, research and education: breaking in and out of liminal space

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Abstract

Engineering educators, researchers and designers are all stakeholders in the development of undergraduate engineering degrees, which seek to equip graduates with the knowledge and understanding, skills, attitudes and experience required in the profession. These stakeholders are often in conflict when considering the desired learning outcomes for graduate engineers. Breaking in and out of liminal space is presented as the core skill which we wish to pass on to engineering graduates. It provides a focus for constructive discussions on curriculum, activities and assessment on engineering degree courses.

Keywords: liminal space, liminality, engineering, design, research, education

1 Introduction

Liminality is presented as a concept implicitly familiar to engineering educators, researchers and designers, as a state of challenge and discomfort that we must flux in and out of in order to advance our respective aims. Each of these areas of practice can be viewed as an iterative rather than a linear process, where the participants become comfortable with fluctuating in and out of liminal space. Effective practitioners, engineering academics, students, researchers and designers must be capable of this transition, not allowing themselves to exist either fully in the world of knowledge and understanding, or in the world of creativity and fantasy.

2 Design

The use of design courses in leading learners into and out of liminal space is advocated. Several recent studies have investigated and encouraged the inclusion of design activities and projects on undergraduate and postgraduate degree courses in the UK [1], as well as in North America [2] and Europe. While the ability to rapidly enter and exit liminal space is not extensively mentioned in these studies, this is the defining feature of successful design processes, and the characteristic that is bought about in students undertaking design projects [3].

Design is seen as a flexible process with designers needing to be able to define, evaluate and act, while constantly being able to transition between each of these stages. Liminal space is the transition zone between these stages where divergent-convergent thinking occurs. It has parallels with the concepts of open and closed modes of operating and that of 'T-shaped' individuals, where the vertical component of the 'T' representing depth of specific technical knowledge and understanding, and the horizontal component represents breadth of diverse interests and influences (Figure 1). In jumping between open and closed modes and between the two parts of the 'T' engineering designers demonstrate the ability to flux in an out of liminal space.

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