Towards a Design Thinking Mindset in Academic Staff Development: Cross-continental design principles for blended learning course design

Daniela Gachago: Cape Peninsula University of Technology
Laura Cruz: Pennsylvania State University
Jolanda Morkel: Cape Peninsula University of Technology
Michele Parker: University of North Carolina Wilmington

Abstract

As a contemporary and boundary spanning approach, design thinking is entering higher education yet is unestablished in academic staff development. This study aims to reflect on two staff development interventions, one offered in the United States and one in South Africa, on blended learning course design, aimed at promoting a 'design thinking mindset' among university lecturers. By analysing the design process and features of both programmes, we discuss the implications and potential of design thinking for academic staff development. Across these two contexts, there exists an increased awareness of and empathy for a diverse student body, the value of interdisciplinary collaboration, peer mentoring, and reflective thinking. We found that adopting design thinking is not without challenges, which include the need for continued practice, securing departmental buy-in and upscaling initiatives. Five themes emerged from the data, namely engaging in human-centred design, creating a safe space for experimentation and play, fostering a sense of community, sharing and generosity beyond disciplinary borders, promoting intensive, ongoing/sustainable engagement beyond course participation and applying evidence base while recognising the need for discipline-specific/contextual solutions.

Based on the findings, and related to the five themes, we formulated ten cross-continental design principles to employ design thinking in academic staff development, towards nurturing creative confidence and learner empathy. These principles include aiming for human-centred design and promoting intensive and inclusive engagement with the design thinking process. Successful staff development programmes will rely on striking a balance between developing design thinking skills, a design thinking mindset, and creative confidence.

Keywords: Design thinking, design thinking mindset, design principles, academic staff development, faculty development, blended learning, higher education, South Africa, USA

Introduction

The environmental crisis and economic and political instability (Granados 2018) is straining Higher Education (HE) worldwide, amplifying social and economic inequality. Goodyear (2015) reports widening access, graduate under-preparedness for rapidly changing workplaces, and dwindling public funding as global challenges to HE. Recently, South Africa faced widespread disruption as a result of national protests against untenable university fees, Westernised curricula, and student exclusions. These student-led protests have highlighted the inequality that persists in the country's tertiary system and pointed to the need for fresh approaches to addressing systemic problems in HE. While not a panacea to structural inequality, 'design thinking' is a contemporary and boundary spanning approach to 'wicked problems', i.e. problems of sufficient complexity and interdependence to defy resolution, in both academia and civil society (Buchanan 1992; Goodyear 2015). More recently, design thinking has witnessed an uptake in universities around the world – beyond the design disciplines – as a learning paradigm that nurtures creative problem solving and multi-perspective collaboration (Von Thienen, Royalty & Meinel 2017). Berger (2009, p. 3) defines design as a 'way of looking at the world with an eye towards changing it'. Design thinking then becomes a process of solving problems differently, allowing for diverging and converging thinking, but also as a set of tools and activities to promote creativity and to challenge some of the assumptions and habits in academia, and finally as a mindset, characterised by a problem orientation, collaboration, generosity, learner empathy, resilience, etc. (Gachago et al. 2017; Goodyear 2015).

Yet, despite its purported benefits, design thinking is under-researched in academic staff development[16] (a practice called educational development in the United States) (Gachago et al. 2017; Goodyear 2015). The aim of this study, therefore, is to reflect on two cases/staff development interventions, one in the United States, another in South Africa, aimed at developing a 'design thinking mindset' among university faculty. Both staff development interventions focus on supporting academics in the design of blended/online learning interventions using design thinking principles such as the importance of interdisciplinary collaboration while recognising disciplinary context, experimentation and risk-taking and user-centred design. In this paper, the authors describe these two cases and discuss them using the literature on integrating design thinking into higher education.

Literature review

Staff development in higher education

Increased use of technology for teaching, learning, and assessment in higher education (Dahlstrom 2015) may not translate into a visible change of practice as lecturers continue to replicate behaviourist/teacher-centred teaching and learning methods (Ivala 2016; Ng'ambi et al. 2016). Moreover, most conventional training and support on the use of technology in teaching and learning focuses on the effective use of technology, with little emphasis on course design and preparation of lecturers to integrate technology in their practice effectively (Dysart & Weckerle 2015; Ivala 2016; Sharples 2019). Often academic staff development is offered via once-off seminars that raise awareness around opportunities of using technology in teaching and learning and showcase innovative approaches at the institution. What is missing, however, are longer-term sustainable (inter- or intra-) institutional strategies, which allow for follow-up and collaboration between academics and academic staff developers both in terms of technical and pedagogical support, such as short courses or the setup of peer-to-

---

[16] We are using the terms faculty and academic staff interchangeably in this paper.

peer support/networks on departmental, institutional or inter-institutional basis (Ivala 2016; Mackh 2018).

Design thinking in academic staff development

Despite the establishment of the Hasso-Plattner-Institute of Design Thinking (HPI d.schools) at the Universities of Potsdam, Stanford, and most recently Cape Town, the growing need for design thinking across diverse curricula is not generally associated with the domain of innovation in learning and teaching in higher education or employed for academic staff development (Goodyear 2015). Human-centred design offers what most instructional design models lack, namely a focus on the person we design for (Brown 2009; Walling 2014), resulting ideally in a co-design/co-creation process (Retegi et al. 2019). In traditional instructional design models, there is also a limited focus on creativity (Clinton & Hokanson 2011). Finally, the emphasis that design thinking puts on ethics is of particular importance in the context of student protests in South Africa, which highlights unequal access to resources.

Human-centred design starts with deep empathy for the often-implicit ways of doing on the part of the client. In the case of faculty development, this is the faculty member. Overall, the literature on general faculty motivation remains relatively sparse; though there does seem to be consensus on categories of motivators, including autonomy, recognition, community, and efficacy (Wergin 2001). Faculty de-motivation (or resistance) is a mitigating factor in the development of online and hybrid courses (Mitchell & Geva-May 2009; Mitchell, Palarmis & Claiborne 2015; McQuiggan 2007); and faculty reluctance held up as a barrier to institutional efforts to transform teaching (Brownell & Tanner 2012; Lane 2007; Tagg 2012). A renewed emphasis on understanding both the explicit and implicit factors that drive faculty has the potential both to inform, not only how we design and deliver educational development experiences and also how we think about influencing changes in institutional culture.

Methodology

In this paper, we draw from two separate cases, one set at the Cape Peninsula University of Technology (CPUT) and the other from the University of North Carolina (UNC) System. Both cases' studies were written up independently (see Gachago et al. 2018 for the Cape Peninsula University of Technology research and Cruz & Parker 2019 and Parker et al. 2018 for the UNC System research). The Cape Peninsula University of Technology research design was qualitative, drawing from written reflections, open-ended questionnaires, and focus group discussions, while the University of North Carolina System case employed a mixed-methods research design, combining quantitative and qualitative survey data. The details of these two studies are shared elsewhere. This paper focuses on comparing the design principles emerging from the two case studies to explore and define cross-continental design principles.

Case studies

First, we briefly introduce the South African case study, the short course, designing blended learning (DBL), at the Cape Peninsula University of Technology (CPUT). This is followed by the American case, i.e. the University of North Carolina's instructional innovation incubator (i3) model.

Case 1: Designing blended learning at Cape Peninsula University of Technology

In 2016, the Centre for Innovative Education Technology (CIET) servicing the six faculties at the institution embarked on the design of a 10-week short course on blended-learning course

design in collaboration with design experts at the institution (this was later condensed into a five-week course). Design thinking was the course focus, drawing on a study about shared characteristics of eLearning champions at the institution (Gachago et al. 2017). The seven themes that emerged from interviewing these 'champions' were collaboration and generosity; learner empathy; problem orientation; exploration and play; reflection and resilience; focus on practice and becoming change agents. We found that these characteristics overlapped with a design thinking mindset (d.school 2011; Schweitzer and Groeger 2016).

Researchers show that design thinking is not necessarily an inborn talent of designers, but a skill that can be developed (Rauth et al. 2010; Lawson 2005), or a muscle that can be trained, as the founders of the d.school, Tom and David Kelley (2014, pp. 2–3) state: 'Creative confidence is like a muscle – it can be strengthened and nurtured through effort and experience'. This happens both through unconscious adoption as much as through formal training (Porcini 2009). Following design thinkers such as Rauth et al. (2010) who argue that design thinking education (i.e. the process of teaching design thinking) can develop creative competence that 'assures the students [in this case, the faculty] of their ability of acting and thinking creative' (2010, p. 7), we designed a short course that would incorporate design thinking strategies, processes and promote a design thinking mindset.

We used Mishra and Koehler's (2003) suggestion to work with design principles and model design thinking in the design of the short course. While face-to-face workshops were used to engage with mentors and colleagues through design activities, we discussed readings on more theoretical topics of blended learning in online seminars. Following others (i.e. Ulibarri et al. 2014), this strategy was employed to challenge lecturers to exchange analytical, deliberate modes of being for a more experimental, creative, and playful approach. The course design was iterative, responding to participants' feedback (through, for example, weekly reflections and other forms of interaction). The following table describes examples of the learning design strategies that we employed to promote a champion mindset.

Table 1: Example of strategies employed to develop an eLearning champion mindset in designing blended learning at the Cape Peninsula University of Technology

Characteristics	Examples of strategies employed to promote this principle
Collaboration and generosity	Participants sign up as departmental course design teams and engage in interdisciplinary group work. Involvement of mentors (often previous cohorts of participants) who volunteer time to share their experiences.
Learner empathy	Introduction of persona development activity (Seitzinger 2016), which asks participants to graphically represent their 'typical students', user archetypes that help define the intended design activity (Van Zyl & De la Harpe 2014). The persona is an informed and experienced description of hypothetical learners, their contexts, challenges and goals. Design decisions are taken in relation to these personas.
Problem orientation	Focus on problem finding: the use of world cafe methodology (Soeder 2016) which facilitates large group conversations, encouraging everyone's contribution, connecting diverse perspectives and promoting shared collective discoveries. Problems are seen as opportunities to innovate rather than limitations.
Exploration and play	Creation of a playful atmosphere through design activities, such as learning metaphors, prompting and guiding the development of a learning activity or a course by imagining all elements within a learning

	experience (Morkel 2015). Creativity, competition and playfulness are promoted through the introduction of diverse tools and technologies.
Reflection and resilience	Weekly reflections, challenging tasks (such as the facilitation of webinars by participants), online and face-to-face engagements, which Lawson calls 'reflective design conversations' (2005). The use of mobile apps, such as flipgrid, support weekly reflections on tools implemented/experiences with course technologies. Lecturers/faculty are positioned as experts navigating difficult and diverse contexts, and modelling of 'Plan B' approaches.
Focus on practice	The use of mentors (slightly more experienced designers/eLearning champions) to share their practice with participants. Linking of theory and practice, and the immediate application of content and tools. Recognition that there is no 'one-size-fits-all' approach.
Change agents	Mentors model change and offer encouragement, to transfer learning into departments. Development of creative confidence through prototyping innovative interventions. Involvement of participants in subsequent workshops/seminars, by sharing their experiences. Continued relationships with participants through longer-term academic writing or research projects.

Source: Gachago et al. 2017

Written reflections, course evaluation forms and focus group discussions were used to assess the impact of the course implementation in 2017 and 2018. Participants' feedback was positive, and there was evidence of a shift in how they understand and engage in course design. Course participants also displayed a growing awareness of the complexities of designing learning for a diverse student population. The course encouraged playfulness and experimentation through the selected design activities, the informal atmosphere and the mentors (i.e. slightly more experienced eLearning champions), who shared their practice and experience – all of which has helped develop creative confidence in participants. 'Designing-on-the-go' also added to the atmosphere of experimentation, openness, and modelled risk-taking. Similar to other studies (Ulibarri et al. 2014), participants appreciated the course as a safe space to think, talk about design and 'play at design'. 'Designerly ways of knowing' (Cross 2007) were modelled and evident in participants' responses. Among vital feedback was the need to (co)-design with and for all participants. Participants' responses reminded us to be sensitive to designing for a diverse group of people – those digital literate and less literate, those more or less risk-averse, those in teaching positions and other roles, those drawn to academic readings and those looking for more accessible information.

Taheri et al. (2016) suggest that interventions that promote design thinking must both focus on creating a safe space for participants to develop a belief in their creative ability while nurturing skills that allow creative agency. This is salient in professional contexts, where individuals need to apply their learning within their working contexts. Compared to other design spaces, design in and for educational settings is challenged by existing practices, limited resources, and risk-averse cultures (Goodyear 2015). Engaging in an enabling space and with like-minded colleagues such as found in this course, therefore, might result in unrealistic expectations of what could happen beyond the training. However, as Irwin (2015, p. 93) notes, when introducing design thinking into new contexts, at the beginning the value of design thinking processes may not be 'the ideas and solutions we developed but rather the cultural transformation that resulted… [the] collaborative, consensual group process that became the

basis for profound change'. The community of practice emerging in and beyond the course was an important result of the sustainable impact of the staff development intervention.

Case 2: Instructional innovation incubator (i3) at University of North Carolina

The genesis of the instructional innovation incubator, or i3, model was an after-hours conversation between a senior administrator, an educational developer, and a venture capitalist. Outside of regular work hours and space, each felt emboldened to voice authentic concerns about the current state of support for online teaching and learning in the United States higher education and found their concerns resonating with their colleagues. That led to more systematic efforts to address persistent challenges using a design-thinking framework. The pioneers worked together to identify stakeholders; brainstorm creative solutions; and develop the i3 prototype, the pilot of which ran in the summer of 2013. The initial iteration of i3 included faculty from 15 of the 17 campuses of the University of North Carolina system; the full i3 sessions ran for three more years, and the model adopted by other institutions continues in a variety of contexts.

The foundation of i3 is a week-long residential academy (approximately 60 contact hours), participation in which is determined through a highly selective process across multiple campuses and disciplines. The academy experience is designed to be grounded in evidence (through the inclusion of a roster of expert facilitators); the application of design thinking models that take into account an intensive understanding of local learning contexts; and mixed and flexible delivery based on participant level and interest. The latter would be especially evident to a casual observer. On a typical day of i3, participants (called fellows) have up to twenty activities to choose from; and each participant navigates their pathway through the offerings (Cruz & Parker 2019). For a list of the design principles and strategies used throughout i3 (Table 2).

Table 2: i3 design principles and strategies

i3 design principles	Strategies
Transferability	− i3 makes use of technology-agnostic platforms. − The emphasis is on the integration of design principles rather than prescriptive practices.
Intensive Engagement	− The initial i3 session takes place over a full week (60+ contact hours); with the aim not just of informing, but transforming practice. − Participants can map out their i3 experience, selecting from multiple activities to suit their own professional development needs.
Evidence Base	− The institute promotes an alternative to best practices in the form of the critical application of evidence to specific disciplinary ways-of-knowing. − i3 fellows frequently form inter-disciplinary tiger teams that focus on mastery of a shared pedagogical challenge. − There are design, pedagogical, and technological mentors available each day.
Innovation	− The i3 experience is framed around a series of open intellectual problems that require creative and critical thinking both within and across disciplines to resolve.

	− Each day of i3 includes i3 talks, short sessions led by role models from multiple industries and disciplines. − The structured work time includes consultations with the imagination station, a place to consider creative ways to blend disciplinary content with pedagogy.
Human-centred design	− The design of i3 is based on deep empathy with the challenges faced by faculty in designing online courses. There is particular emphasis on autonomy and efficacy. − On the first day, participants literally and figuratively start with a blank slate, a huge sheet of paper, and no computers are allowed on the first day. − The course design process begins with the creation of student-centred empathy maps.
Sustained/ sustainable	− i3 alumni participate in ongoing multi-institutional learning communities. − i3 fellows serve as liaisons or ambassadors for online teaching and learning at their respective campuses.

Source: Parker, Cruz & Baffour 2018

i3 faculty were free to explore, to take risks, to experiment in ways that they may have been uncomfortable doing in front of colleagues who might serve on future review committees. Also, they could design courses apart from previously applied norms, models, or structures generated by departments and colleges. Nor were they limited by the reach of their IT units. i3 fellows regularly experimented with technologies or techniques that were not available or not supported on their campuses. Perhaps most importantly, the i3 experience, by being disconnected from the campus environment, provided the space, both literally and figuratively, for faculty members to think outside of the box, and to challenge themselves to have not just confidence, but the courage to try new things.

To assess our results, we conducted a survey-based study with three cohorts of i3 fellows, 84 in total, ranging from 2014 to 2016. In our analysis of the open-ended survey responses, we noticed that faculty talked about shifts in their attitudes towards online education; a significant obstacle that had informed our design; but several responses also demonstrated greater agency and advocacy even beyond the online context. One respondent gushed, "nothing is impossible in this unique opportunity to collaborate, be inspired, access excellent expertise, and open your mind to new perspectives and ideas that can propel your confidence and success in online teaching". Another respondent indicated a more subtle change to understand that "a class is more about the students than the teacher […] at i3@UNC, that was underscored for online environments" (Cruz & Parker 2019). It would appear that the i3 experience changed our faculty into designers, i.e. those with the vision to see what can be improved and the tools and attitude to make teaching and learning happen.

Towards cross-continental design principles

The two cases originated on different continents, within different contexts, responding to different challenges and differed significantly in terms of scope, size, and delivery. The one is a small-scale five-week intervention at one institution and the other a much larger, multi-institutional, intensive six-day process, yet the design principles that they employed overlap in many ways (Table 3). The results from the evaluation are similar, and with some outcomes reinforced through the multi-institutional structure in the University of North Carolina case.

Table 3: Combined themes/design principles

Emerging themes	Designing blended learning at Cape Peninsula University of Technology	i3 at University of North Carolina
− Engage in a human (faculty/student)-centred design	− Learner empathy − Problem orientation	− Human-centred design
− Create a safe space for experimentation and play	− Exploration and play	− Innovation and experimentation
− Foster a sense of community, sharing, and generosity beyond disciplinary borders	− Collaboration and generosity	− Inter/transdisciplinary evidence base
− Promote intensive, ongoing/sustainable engagement beyond course participation	− Change agents − Reflection and resilience	− Intense engagement − Sustained/sustainable
− Evidence base while recognising the need for discipline-specific/ contextual solutions for problems	− Focus on practice − Reflection and resilience − Problem orientation	− Transferability − Evidence base

Five themes emerged from the data, namely engaging in human-centred design; creating a safe space for experimentation and play; fostering a sense of community, sharing and generosity beyond disciplinary borders; promoting intensive, ongoing/sustainable engagement beyond course duration and applying evidence base while recognising the need for discipline-specific/contextual solutions. Based on these five themes, we suggest, therefore, the following ten cross-continental principles for academic staff development for blended learning course design:

1. Aim for **human-centred design** by shifting the focus to the user (learner or faculty), through **empathy,** by imagining her context (life world), resources, challenges and goals (ideally co-designing with all involved stakeholders)
2. Promote **intensive and inclusive engagement with the design thinking process** made explicit, towards transforming mindsets and practices
3. Create a **'safe' creative space to experiment, take risks and fail, to challenge attitudes of perfectionism** prevalent in academia, maintaining the balance between playfulness and perfection with the help of role models from multiple industries and disciplines
4. Implement an **iterative and incremental approach to creative and critical thinking**, focusing on small steps/changes while working on larger projects (course designs); model a responsive 'design on the go' approach
5. Stimulate opportunities for **immediate application of content and skills and ongoing reflection** to position faculty as 'experts'; grow creative and technological confidence and resilience
6. Provide **scaffolding through design activities and prototyping to help participants build their own creative confidence**, to apply design principles rather than implement prescriptive practices; facilitate opportunities for **practice-sharing of participants and**

mentors based on evidence but also recognising that one-size does not fit all and there is a need for discipline-specific solutions

7. Focus on **learning** and **teaching** rather than tools and technology
8. Involve **mentors, liaisons and ambassadors**, to provide on-the-go support and model the becoming of change agents
9. Grow an **interdisciplinary community of practice** to collaborate and help transfer design thinking into departments, promoting continued engagement beyond workshops, to ensure the sustainability of the staff development intervention
10. Create opportunities for **follow-up design challenges,** such as presentations, sharing of experiences and involvement in research projects, allowing participants to become 'mentors' themselves

Our reflection on these two cross-continental cases emphasises striking a balance between process and product, playfulness and structure, challenging tasks and a feeling of safety and trust, lightness and depth, providing a safe space for experimentation while promoting risk-taking, combining established elements of academic staff development (e.g. peer-reviewed readings) to build trust, with activities that push participants' thinking about teaching and learning. Most importantly, it shows how relationship-building, through follow-up and continued work, including constructive feedback on lecturers' practice, is crucial to strengthen cognitive, affective, and skill-based outcomes of academic staff development interventions. Design is a slow process (Goodyear 2015; Irwin 2015; Ulibarri et al. 2014) – not a quick fix.

To sustainably transfer design thinking into one's practice and to expand it into departmental practice requires drawing from a rich and diverse community of practice. Towards this end, course participants should be encouraged to share their experiences and blended course design approaches and strategies at various departmental, faculty, or institutional meetings. In our experience, the impact of such transfer of ideas, thoughts, and attitudes into the daily practice of academic staff/faculty, however tricky to measure, may be one of the most significant outcomes of these interventions.

This transfer of knowledge speaks to the potential of design thinking to influence not just practice, but broader cultural values within higher education. The academic staff/faculty who participated in both of these interventions indicated that they felt not only more knowledgeable about the course design process; but they felt more profound (and somewhat immeasurable) changes in their own motivations, perceptions, and well-being. Perhaps it is possible that the wicked problems faced in higher education could be addressed if we considered (re-)designing higher education, both by and for all of the students, faculty, and staff who do the work of academia.

References

Brownell, SE & Tanner, KD 2012, 'Barriers to faculty pedagogical change: Lack of training, time, incentives, and… tensions with professional identity?', *CBE—Life Sciences Education,* vol. 11, no. 4, pp. 339-346.

Buchanan, R 1992, 'Wicked problems in design thinking', *Design Issues,* vol. 8, no. 2, pp. 5-21.

Brown, T 2009, *Change by design,* New York, HarperCollins. Retrieved from <http://books.google.com/books?id=x7PjWyVUoVAC&pgis=1>.

Clinton, G & Hokanson, B 2011, 'Creativity in the training and practice of instructional designers: the design/creativity loops model'*, Educational Technology Research and Development,* vol. 60, no. 1, pp. 111-130. <http://doi.org/10.1007/s11423-011-9216-3>.

Cross N 2007, Designerly ways of knowing. Basel: Birkhaeuser.

Cruz, L & Parker, M 2019, 'By design: rethinking online teaching', *The Journal of Faculty Development,* vol. 33, no. 1, pp. 25-38.

Dahlstrom, E 2015, *Educational technology and faculty development in higher education: search report,* Louisville, CO, ECAR.

d.school 2011, 'Design mindset and process (PowerPoint)', viewed 5 July 2019, <https://dschool.stanford.edu/resources/getting-started-with-design-thinking

Dysart, S & Weckerle, C 2015, 'Professional development in higher education: a model for meaningful technology integration', *Journal for Information Technology Education: Innovative Practices,* vol. 14, pp. 255-265.

Gachago, D, Hitge, L, Van Zyl, I, Morkel, J & Ivala, E 2018, 'Designing for design thinking: fostering an eLearning champion mindset through academic staff development', in Proceedings of the *13th International Conference on e-Learning*, 5-6 July 2018, Cape Town, South Africa. Ivala, E. (ed.), pp. 104-112. Reading: ACPI.

Gachago, D, Morkel, J, Hitge, L, van Zyl, I & Ivala, E 2017, 'Developing eLearning champions: a design thinking approach', *International Journal of Educational Technology in Higher Education*, 14, no. 1. <http://doi.org/10.1186/s41239-017-0068-8

Goodyear, P 2015, 'Teaching as design', *HERDSA Review of Higher Education,* vol. 2, no. 2, pp. 27-50, viewed 5 July 2019, <http://www.herdsa.org.au/system/files/HERDSARHE2015v02p27.pdf>.

Granados, J 2018, 'The challenges of higher education in the 21st century', Global University Network for Innovation, viewed 5 July 2019, <http://www.guninetwork.org/ articles/challenges-higher-education-21st-century>.

Irwin, T 2015, 'Redesigning a design program: how Carnegie Mellon University is developing a design curricula for the 21st century', *Solutions*, February, pp. 91-100.

Ivala, E 2016, 'Educational technology training: staff development approaches', *International Journal of Educational Sciences,* vol. 14, no. 3, pp. 195-204.

Kelley, T & Kelley, D 2014, *Creative confidence– unleashing the creative potential within us all*, London, William Collins.

Lane, IF 2007, 'Change in higher education: understanding and responding to individual and organizational resistance', *Journal of Veterinary Medical Education,* vol. 34, no. 2, pp. 85-92. <https://doi.org/10.3138/jvme.34.2.85>.

Lawson, B 2005, *How designers think: the design process demystified* (4th ed.), Oxford, Architectural Press.

Mackh, BM 2018, *Higher education by design*, New York, Routledge.

McQuiggan, CA 2007, 'The role of faculty development in online teaching's potential to question teaching beliefs and assumptions', *Online Journal of Distance Learning Administration,* vol. 10, no. 3, pp. 1-13.

Mishra, P & Koehler, M 2003, 'Not "what" but "how": becoming design-wise about educational technology', in Y. Zhao (ed.), *What do teachers need to know?*, pp. 1-28, Educational Technology Publications.

Mitchell, B & Geva-May, I 2009, 'Attitudes affecting online learning implementation in higher education institutions', *Journal of Distance Education*, vol. 23, no. 1, pp. 71-88.

Mitchell, LD, Parlamis, JD & Claiborne, S A 2015, 'Overcoming faculty avoidance of online education: from resistance to support to active participation*', Journal of Management Education*, vol. 39, no. 3, pp. 350-371.

Morkel, J 2015, 'Ideate crea8 iterate: a learning design workshop, ELearning Update', Caesar's Palace, Johannesburg, viewed 5 July 2019,

<https://www.slideshare.net/jolandamorkel/learning-design-workshop-at-elearnigupdate-2015>.

Ng'ambi, D, Brown, C, Bozalek, V., Gachago, D & Wood, D 2016, 'Technology enhanced teaching and learning in South African higher education– a rearview of a 20 year journey', *British Journal of Educational Technology,* vol. 47, no. 5, pp. 843-858. <http://doi.org/10.1111/bjet.12485>.

Parker, M A, Cruz, L & Baffour, T (2018, July), 'The 13 model: rethinking how faculty teach quality online and blended courses', in ICEL 2018 *13th International Conference on e-Learning*, 5-6 July 2018, Cape Town, South Africa, Ivala, E (ed.), pp. 323-330, Reading, ACPI.

Porcini, M 2009, 'Your new design process is not enough—hire design thinkers!', *Design Management Review,* vol. 20, no. 3, pp. 6-18.

Rauth, I, Köppen, E, Jobst, B & Meinel, C 2010, 'Design thinking: an educational model towards creative confidence', 1st International Conference on Design Creativity (ICDC 2010), (December).

Retegi, A, Sauvage, B, Predan, B, Tomás, E, Schosswohl, G, Kaltenbrunner, M & Draganovská, D 2019, 'The co-create handbook for creative professionals', *Co-Create Consortium*, viewed 5 July 2019, <http://www.cocreate.training>.

Schweitzer, J, Groeger, L & Sobel, L 2016, 'The design thinking mindset: an assessment of what we know and what we see in practice', *Journal of Design, Business & Society*, vol. 2, no. 3, pp. 1-23. <https://doi.org/10.1386/dbs.2.1.71_1>.

Seitzinger, J 2016, '10 learner experience powers from experience girl!', viewed 5 July 2019, <https://www.slideshare.net/catspyjamas/10-learner-experience-powers-from-experience-girlimoot16-agents-of- change>.

Sharples, M 2019, 'To improve education– focus on pedagogy not technology, OED insights', viewed 4 July 2019, <https://oeb.global/oeb-insights/to-improve-education-focus-on-pedagogy-not-technology/>.

Soeder, U 2016, 'The World Cafe design principles', viewed 5 July 2019, <http://www.theworldcafe.com/keyconcepts- resources/design-principles >.

Tagg, J 2012, 'Why does the faculty resist change?', *Change: The Magazine of Higher Learning*, vol. 44, no. 1, pp. 6-15.

Taheri, M, Unterholzer, T, Strasse, H, Hölzle, K & Meinel, C 2016, 'An educational perspective on design thinking learning outcomes', in *The ISPIM Innovation Forum*, Boston, USA, ISPIM.

Ulibarri, N, Cravens, AE, Cornelius, M, Royalty, A & Nabergoj, A S 2014, 'Research as design: developing creative confidence in doctoral students through design thinking', *International Journal of Doctoral Studies*, vol. 9: 249-270.

Van Zyl, I & De la Harpe, R 2014, 'Mobile Application Design for Health Intermediaries, Considerations for Information Access and Use', in *Proceedings of the International Conference on Health Informatics (HEALTHINF)*, pp. 323-328. Angers, France.

Von Thienen, J, Royalty, A & Meinel, C 2017, 'Design thinking in higher education: How students become dedicated creative problem solvers', in *Handbook of research on creative problem-solving skill development in higher education*, Hershey, PA, IGI Global pp. 306-328.

Walling, DR 2014, *Designing learning for tablet classrooms: Innovations in instruction*. Basel, Springer International.

Wergin, JF 2001, 'Beyond carrots and sticks: what really motivates faculty', *Liberal Education*, vol. 87, no. 1, pp. 50-53.