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Out of Sight, Out of Mind: Curriculum Representation in Design Education Today

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Abstract: *Within industrial design education, curriculum visualisations have historically – in modern-era Germany and USA in particular – played a powerful role in communicating the purpose and content of design education. However, as design practice has diversified and knowledge proliferated the task of visualising complex curricula has become increasingly difficult, to the extent that curriculum visualisations are a rare sight in education or research today.*

Why do design educators, not seek to give form to the products of their curriculum design process? What value could curriculum visualisation have for educators today?

Through reflections on literature, educator interviews and workshops, this paper will argue that – far from being an outmoded form – the value of curriculum visualisation remains undiminished. Visual representations can serve three main functions): to aid thinking (for individuals) collaboration (with someone specific) and communication (to an audience). In this vane, curriculum visualisations can aid the design process for individual practitioners, or as boundary objects that mediate the collaborative process of curriculum design between different actors (professors, tutors, administrators) and situate the position of a programme within the institution, discipline and society at large (to prospective students, staff and academic colleagues).

Keywords*: curriculum visualisation; boundary objects; curriculum design; curriculum theory*

Introduction

Within industrial design education, curriculum visualisations have historically – in modern-era Germany and USA in particular – played a powerful role in communicating the purpose and content of design education (Findelli, 2001). However, a recent look at the websites of 50 leading design schools across North America, Europe and Asia (see Table 1) reveals only nine examples of institutions today representing the scope of their curricula visually.

Table 1 Incidence of visual representations of curricula on the websites of design institutions (Business Insider, 2012; Archdaily, 2014)

Institution	*Country*	*Visual*	*Institution*	*Country*	*Visual*
Aalto University	Finland	Yes	Loughborough University	UK	No
Art Center College of Art and Design	USA	No	Massachussets Institute of Technology Media Lab	USA	No
Brunel University	UK	No	National Institute of Design	India	No
California College of the Arts	USA	No	Northumbria University	UK	No
Carnegie Mellon University	USA	Yes	Northwestern University	USA	Yes
Case Western Reserve University	USA	No	Nottingham Trent University	UK	No
Chiba University	Japan	No	Parsons The New School for Design	USA	No
China Central Academy of Fine Arts	China	No	Politecnico di Milano	Italy	No
Copenhagen Institute of Interaction Design	Denmark	No	Pratt Institute	USA	No
Copper Union	USA	No	Ravensbourne University	UK	No
Cranfield Univerisity	UK	No	Rhode Island School of Design	USA	No
Delft University of Technology	Netherlands	No	Rochester Institute of Technology	USA	No
Design Academy Eindhoven	Netherlands	No	Royal College of Art	UK	No
Domus Academy	Italy	Yes	Savannah College of Art and Design	USA	No
École nationale supérieure de création industrielle	France	No	School of Visual Arts	USA	Yes
Edinburgh University	UK	No	Shih Chien University	China	No
Glasgow School of Art	UK	No	Stanford University D-School	USA	No
Hochschule Luzern	Switzerland	No	Technical University Delft	Netherlands	No
Hong King Polytechnic University	Hong Kong	No	Umeå University	Sweden	Yes
Illinois Institute of Technology	USA	Yes	University of California	USA	No
Imperial College London	UK	No	University of Cincinatti	USA	Yes
KAIST	South Korea	Yes	University of Dundee	UK	No
Köln International School of Design	Germany	No	University of Gothenburg	Sweden	No
Konstfack University	Sweden	No	University of the Arts	UK	No
Korea University of Science and Technology	South Korea	No	University of Toronto	Canada	No

This paper seeks to address the question of why design educators and institutions do not seek to 'give form' to the products of their curriculum design process, and what value could curriculum representations have today? After reflections on existing literature – within and beyond design discourse – a framework for understanding curriculum representations will be identified, and through discussion of a series of educator interviews and an educator workshop, the issues of curriculum representation for different purposes will be explored, and a new value proposed.

Framing curriculum

In discussing its representation, it is first worth defining the terms on which we refer to curriculum. In curriculum studies – out with design discourse – there has been extensive discussion about the definition and role of curricula. Returning to its etymology, we find it to be derived from the latin *currere*, meaning to run the course or race (Slattery, 1995). For Slattery, this meaning has a strongly developmental undertone with curriculum embodying the idea of educational journey. For others, this idea of curriculum can be expanded even further, not only including the journey experienced though a specific class or degree program (for example), but to include 'everything that happens, and everything that does not happen, within a school' (Whitson 2008, p.116). However, for Slattery this wider definition of curriculum has been lost within an educational discourse focussed on the curriculum as 'object', made up of lessons and materials. Rather than seeing the curriculum as the journey of moving through the 'course' itself, it is argued that conceptions of curriculum have been bound up with positivist views of knowledge and the role of education in its dissemination.

Surveying the evolution of curriculum studies, Grimmet and Halvorson (2010) reflect on a number of curriculum discourses identified by Pinar (1995) that seek to move away from this positivist view of the curriculum. Both agree that any quest to establish a rational meta-narrative for the study of curricula is futile and that a curriculum can only be read as a 'text' within a specific institutional context. For Pinar this leads to the aim of understanding how the curriculum 'works' within a particular institutional context: it's function and how it can be measured. For Grimmet and Halvorson though, Pinar's framing of curriculum is misplaced and symptomatic of a lingering positivism in curriculum studies. Instead, they argue that more stretching questions may be asked about how curricula as 'texts' are developed in the first place, and how the 'system world' of the curriculum as an object relates to the 'life world' of learning. In this sense a curriculum should be viewed as shifting sign that connects the system world of the institution to the life world of the learning experienced by staff and students.

This contextual positioning of the curriculum in specific institutional contexts broadens the conception of who it is for. While curricula may have historically been conceived with the student in mind, the potential audience for curriculum as text should be broadened to encompass the educator (Schwarz, 2006), the institution, and the interaction between them. In this context, Grimmet and Halvorson argue, the curriculum is not a static 'design' that is reached as the answer to a predefined educational problem, it is continually emerging in discourse between a number of stakeholders. In this sense the curriculum can be framed as a 'boundary object' of mediation between educational interests. To Star and

Griesemer (1989, p.393) boundary objects can be abstract or material conceptualisations that 'inhabit several intersecting social worlds [...] and satisfy the informational requirements of each'. Although the term was developed to help describe methods of problem solving in complex science projects, it has been used in the context of education by Herne (2006), Melles (2008) and Banner et al. (2012). For Hultén, the boundary object has specific applicability to curriculum development in that it is a useful conceptualisation of how the challenge of negotiating between different worlds of interest in educational institutions can be resolved (Hultén, 2013). For Wenger, these 'objects' have a cultural as well as problem solving function, as 'artefacts, documents, terms, concepts and other forms of reification around which communities of practice can organize their interconnections' (Wenger 1998, p.105).

If a curriculum is a text that is in a state of continual emergence between the system world of the institution and the life world of education, visual representations of curricula can be positioned as a specific type of boundary object with a potentially multi-faceted role. However, within curriculum studies or design education discourse the potential role and value of visual representations in curriculum remains under-explored. As a result, it is to general discussions of visual representation in education and design discourses that we must turn in order to frame the role curriculum representations can play.

Visual representation

In curriculum studies there is a growing recognition of the role of visual representation within the content of curricula (as opposed to representations of the curriculum), although generally discussed in relation to elementary and high school education. To Eilam and Ben-Peretz (2010) there is a need to consciously develop a dialogue around the use of visual representations in curriculum, due to the recent expansion in the use of multimedia in curriculum materials. This discussion they argue is essential, to avoid 'curricular drift' (Kelly, 2009) and ensure that the use of visual representations is deliberately managed rather than merely left to happen.

For Freedman, the issue of visual representation in curricula is critical to explore as 'the ways we represent through the realm of visual culture shapes peoples' thinking' (Freedman 2003, p.14). Visual representations such as graphs, charts, maps, and diagrams have a symbolic language with their own syntax and way of presenting information, differently from text (Peirce, 1906). Therefore the use of symbolic representations (Kosslyn, 1989) in the content of curriculum has the potential to influence individual learning processes (Eilam and Ben-Peretz, op. cit.). Eilam and Ben-Peretz cite Tyler's Basic Principles of Curriculum (1949) as a framing device for the role of visual representation in curricula. For Tyler, any curriculum making begins with the need to clarify learning objectives. This, it is argued, can be done with three sources in mind: the subject matter of learning, the external context of life outside the institution; and the nature of the anticipated learner. To Eilam and Ben-Peretz, it is also possible to read visual representations within the content of curriculum as texts within these three categories.

Might it also be a useful framing dimension for describing types of curriculum representation?

Shifting focus to the disciplinary discourse within design and engineering, there is no shortage of discussion of the role of visual representation in the design process. Archer

(1979), sought to establish 'modelling' as the essential language of design, analogous to the role notation plays in science and the written word in the humanities. By modelling, Archer referred not only to the final designed artefact, but the drawings, diagrams and physical representations that are used to 'capture, analyse, explore and transmit' ideas throughout the process of design (Archer 1979, p.20). More recent explorations of visual representation in the design process have centred on their role for designers in facilitating the 'creative leap' (Cross 1997, 2004), or as mediators in 'sensemaking' (Kolko, 2010), the practice of reflective problem setting engaged in by designers (Schön, 1994). To Kolko, visual representations function not only as a way of communicating the output of the design process, but as a means of organising the complex array of information that is gathered and structured during this process. In this context, representations – 'concept maps' – help understanding of the problem space and exploration of potential responses. To Stevens (2013) – looking at the role of designers in organisational strategy – the artefacts of the design process can serve a symbolic social function as boundary objects that facilitate conversations about possible future directions.

Ferguson (1992), adds to this discussion a consideration of the different types of visual representation – from sketching, to drawing, to three-dimensional models – and the role they play in the engineering design process. For Ferguson, the seemingly basic activity of sketching has a sophisticated range of purposes: as a thinking tool to aid individuals' design process; as a collaboration tool (e.g. to enable instructions to be understood by colleagues); or, as a communication tool for designers who resort to 'talking through sketching'. Drawing on the other hand, maintains the collaborative and communicative role of sketching, but struggles to function as a thinking tool of as much immediacy as sketching, due to the greater level of visual resolution implied. Although 3D models are generally of the highest fidelity of any representation, they have the most limited range of functions. To Ferguson, these models work primarily as communications tools, serving to introduce new concepts to unfamiliar audiences or act as teaching aides that transmit ideas and principles. Might this distinction between visual representations for thinking, collaborating or communicating (and the appropriate level of fidelity for purpose) also form a useful framing device for describing types of curriculum representation?

A framework of curriculum representation types

From this reading of visual representation in curriculum studies and design discourse, a possible framework emerges for understanding the role of curriculum representations in design education *(see Figure 1).* On one axis we can consider the scope of representation as being either focussed on subject matter, external context or learner (after Tyler). On the other we can consider the function of the visualisation as either a thinking, collaboration or communication tool (after Ferguson).

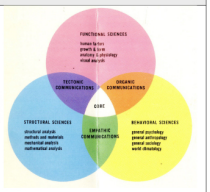
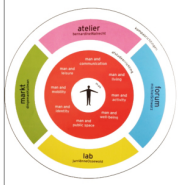
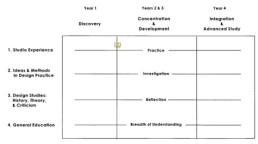
		Function		
		Thinking	Collaborating	Communicating
Focus	Subject	 • Moholy-Nagy, New Bauhaus, 1937		  • Gropious, Bauhaus, Weimar, 1923 • Industrial Design Institute, 1963
	Context			 • Design Academy Eindhoven, 2012
	Learner			 • Buchanan, Carnegie Mellon, 2001

Figure 1 Framework of curriculum representation types

Within the above framework of curriculum representation types, a number of examples have been populated from a review of literature and others sourced through personal contacts in education. From this survey, it appears that a common function of these curriculum representations is in communicating the principles around which design education – in a particular institutional context – is organised. Earlier examples, such as those from the Bauhaus (Findeli, 2011) and Industrial Design Institute (Design Management Institute, 2014) are focussed around the subjects – the disciplinary knowledge, or areas of design practice – that the education seeks to impart on students. More recent examples take other forms. The Design Academy Eindhoven's (2004) human-

centred structure shakes off any notion of objective knowledge; instead pivoting the educational experience around a series of contextual themes that frame design practice. Buchanan's (2001) Carnegie Mellon curriculum on the other hand, organises its educational experience around the developmental stages that the learner will go through – from 'discovery' to 'development' to 'integration' – all the while introducing elements of design's disciplinary knowledge and culture of enquiry to students.

What is clear is that these representations function as boundary objects mainly due to their clarity as communication tools. They are not however – with the exception of Moholy-Nagy's sketch for the New Bauhaus (Findeli, 1990) – 'in progress' thinking or collaboration tools used by individual educators or groups of institutional stakeholders to develop new curricula. Rather, they are conceptualisations of an institution's view of the education it offers can be communicated to the outside world. In this respect it can be seen that this cross-section of curriculum representations over the past 90 years by well-known schools, mirror the evolution of design as a discipline over the same period. Early configurations of design education – with the Bauhaus as a totem –were attempts to mix art, science, and technology to different extents and define design as a discipline with a clear 'meta-project' (Findeli, 2001). Further efforts, including the 1960s 'Design Science' movement – in whose zeitgeist we should consider the Industrial Design Institute curriculum representation – sought to 'scientise' design and distill its methods into a positivist base of empirical knowledge. The Design Academy Eindhoven, meanwhile, should be viewed in the context of a constructivist impulse in design education (Schön, 1994) in which designers, through 'reflective practice', develop intuitive ways of problem setting to deal with the issues in the 'gaps' between disciplinary boundaries. Buchanan (1992, 1998, 2001) takes this one step further, repositioning design in a world of increasing complexity and fragmentation of disciplines, to emerge as an integrator of knowledge from many other disciplines and its education as the new 'liberal art' – or general education – for the 21st century.

What then of the more contemporary examples of curriculum representation in use today? Of the nine examples found in a search of the websites of 50 leading design schools, it is possible to draw some general conclusions about the nature of visual representations created. Firstly, looking at the framework, it is again clear that all of these examples are function as communication devices to the external world (as can be deduced from their presence on institutional websites). Moreover, they are overwhelmingly subject focussed, that is to say that their 'content' is organised according to series of courses, workshops or projects as opposed to external context or learner development. Secondly, all but one of these institutions choose to represent their subject-focussed curricula along the logic of a yearly calendar; with the various projects, elective workshops and subjects that make up each year of study giving form to the educational experience *(see Figure 2 for typical examples).*

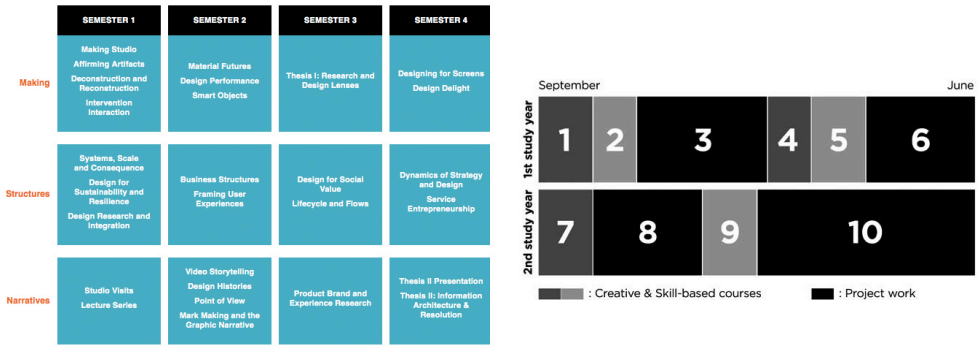


Figure 2 Curriculum representations from School of Visual Arts, MFA Products of Design, USA (2015) (left); Umeä, MFA Advanced Product Design, Sweden (2015) (right)

Comparing these contemporary examples with past examples from the Bauhaus, Industrial Design Institute et al., there is an observable difference in the organising principle of their format. Current examples are by and large 'literal' representations of how the curriculum will 'function' along an institution-led timeline. Whereas historical examples can be seen more as abstract conceptualisations of the value, disciplinary positioning and future designer the institution advocates. For Buchanan (2001), the reduction of contemporary programmes to the logic of planning and scheduling is symptomatic of the absence of a long-term vision for the purpose of design education or the 'character' of designer by educators.

It could be argued that this new reality merely reflects a turn away from positivism in curriculum representation, towards its representation as the 'journey' through a course, and hence closer to its etymology in *currere*. However, the majority of time-based calendar representations still rely on subject-oriented knowledge base for their construction, rather than a more learner-focussed developmental logic. Only Buchanan's curriculum framework for Carnegie Mellon seems to resolve the two *(see Figure 3).*

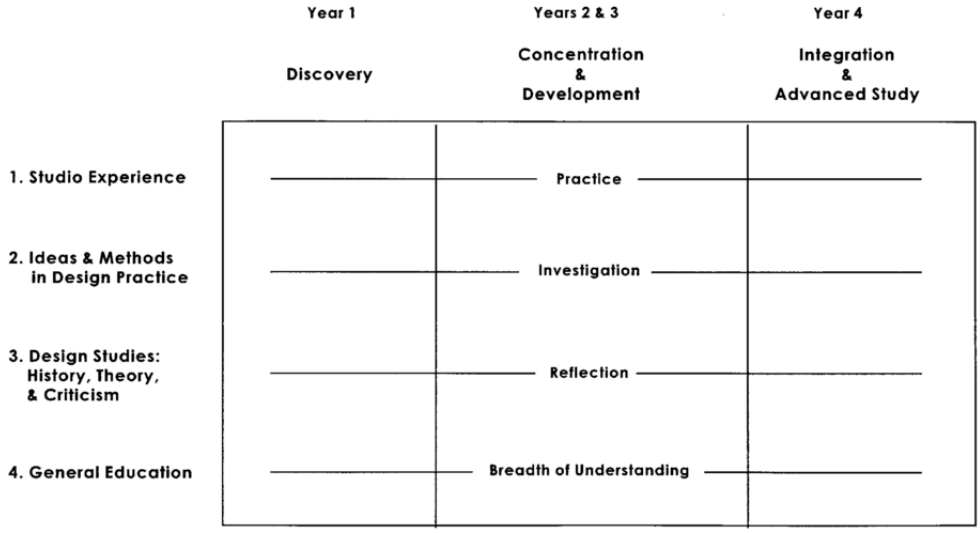


Figure 3 Elements and sequence of the design curriculum at Carnegie Mellon University (Buchanan, 2001)

In identifying and mapping curriculum representations available online, it appears that their publication is rare and that – as could be expected from their sourcing from institutional websites – that their function is overwhelmingly as communication devices. Due to this limitation in the collected sample, it is difficult to determine the actual extent of curriculum representations in use. Are there other forms of representation, how do they function, and what is their focus?

Curriculum representation in practice

In order to explore further the potential role of curriculum representation in practice, two preliminary research activities were conducted as 'pilot studies' during the first stage of a PhD investigation

Firstly, one-hour scoping interviews were conducted with 11 design educators across Europe. As senior faculty members – senior lecturers, programme leaders, or departmental heads – all were participants to some degree in the development and refinement of curricula, at either an undergraduate or post graduate level *(see Table 2).* These wide-ranging depth interviews explored the position of design in their institution, live issues for design educators today, and their thoughts on potential future challenges. As part of this discussion, the presence and role of any curriculum representations was discussed and probed into.

Table 2 Summary of educator sample interviewed

Educator	*Position*	*Programme name*	*Country*
1	Programme leader	MDes Design Innovation	UK
2	Course Leader	MA Industrial Design	Sweden
3	Subject leader	MDes Design Innovation and Citizenship	UK
4	Programme leader	BA Design for Industry	UK
5	Principle lecturer	MA Multidisciplinary Design Innovation	UK
6	Programme leader	MA International design and business management	Finland
7	Head of International Studio	MA Industrial Design	France
8	Senior Tutor	MA Product Design	UK
9	Programme leader	BA Industrial Design	UK
10	Programme leader	MSc Integrated product design	UK
11	Lecturer	BA Product Design	UK

Secondly, a collaborative educator workshop was facilitated at an international design research conference. Through two-hours of discussions, four educators from across different types of institution and countries *(see Table 3)* were asked to describe the purpose of the design education they provide and visualise their curriculum through discussion with a peer. From these initial investigations, it is possible to elaborate further on the curriculum representation types matrix identified earlier, and to identify gaps for further exploration

Table 3 Summary of participants in educator workshop

Educator	*Position*	*Programme name*	*Country*
12	Lecturer	MA Creative Industries and the Creative Economy	UK
13	Programme leader	MA Industrial Design	Italy
14	Head of Design School	Various BA and MA	Brazil
15	Lecturer	MA Fashion Design Management	UK

From educator interviews, there were several findings. Firstly, tangible examples of curriculum representation were again few and far between. However, several educators discussed the concepts underpinning their curricula in very visual or metaphorical language, even though they did not actively refer to any visual conceptualisations of them as such. For example:

> I call it the 'chopsticks model'. Designers as assimilators; in the course of a project students may encounter a variety of different stakeholders, e.g. a Life scientist, Social scientist, Lawyer, Economist, Politician. Designers cut across these areas, touching the long list of participants as design generalists who assemble a knowledge based on a project context. I'm trying to create an awareness of what and how to assemble (Educator 1).

> We create a matrix of themes and practice groups to resolve the tension between breadth and depth. A series of thematic projects run across the course for everyone, e.g. the bathhouse, mobility. Each one with a theme advisor. There will be lectures on these themes, and the themes change every year based on a 'meta programme'. Cutting across the subject themes are project groups (e.g. spatial design, interaction design) with specific discipline tutoring (Educator 2).

> We have a 'knitting pattern' curriculum. Students get to select a project every 6 weeks from a wide range on offer. This gives them a taster of different facets of the discipline: strategic vs old school industrial design, brand values vs. pure business. This makes it a broader curriculum before the third term students do a 1 term 'thin sandwich' industry placement (Educator 4).

Surveying these and other curriculum descriptions, it is apparent that the challenge of managing the breadth of contemporary design practice – to enable sufficient depth of student experience – is central to the discussion of curriculum representation with many educators. In this context, the analogy – the 'chopsticks model', 'knitting pattern', 'matrix' or 'strands' – was used as a device to frame this complexity and give structure to it in some way.

For others though, the response to this complexity is to 'dematerialise' the idea of a curriculum itself. For one, the complexity and breadth of design activity can now be facilitated within the single scope of a single student project. The old idea of curating a patchwork of skills and experiences across different aspects of a curriculum is no longer necessary, with the project becoming the dominant logic of curriculum design:

> We used to educate design's complexity through multiple projects over the course of the year, now students can experience this breadth and complexity in one. When moving into new areas like service and system design, the project complexities are such that this is possible (Educator 7)

In other contexts there is a different impulse behind this dematerialisation. The incorporation of design departments from historically art-school or technical college based institutions has created a different thrust in the conceptualisation of curricula, noted by a two educators. For example:

> There has been a fundamental shift: from programme driven to course driven education. Courses used to be embodied in the programme Now the University's curriculum model says we should be driven by courses. A course is a unit of teaching, e.g. lectures and an essay/exam. So in the university's eye a programme is just a collection of courses, assembled by the student to get credits (Educator 8).

In this way, as education becomes more student oriented and individualised, the value of conceiving of and educating for a singular curriculum becomes less relevant. In another school, the institution has chosen to create a personalised curriculum through a range of projects on offer to all students:

> Our programme is focussed on individual student experience. We have no year groups, so the student experience is project based with students moving horizontally through different projects (across years) to create their own assemblage (Educator 7)

Others struggle to conceptualise the complexity of their curriculum entirely, struggling with the different levels of abstraction:

> There is a lack of clarity between a programme pathway and the underlying course philosophy. Service Design is easy to pull out as a subject, as is Environmental Design. Sometimes I think Citizenship should be the overarching philosophy to the course though - it doesn't have a specific set of tools like the other subjects do. We'd then need to think about economy, ecology and philosophy as these could be common topics for study. How do you nurture the personal attributes alongside the discipline specific skills? (Educator 3)

From this exploration through educator interviews, it has become apparent that there is an opportunity to use visual representations to communicate complex curricula to student and institutional audiences, but that the lack of their widespread use may be a symptom of the changing nature of design practice; the state of design as a discipline, and its position within educational institutions.

Furthermore, the lack of curriculum representation in use could also be described as symptomatic of a lack of conscious thought about the curriculum design process by many educators interviewed. This issue is one that would be supported by Ünlü (2004), who sampled a wider group of design educators in the 1990s and found that there was some 'mysteriousness' around the process of curriculum development within design education, to the extent that drawing any conclusions about the approach taken is difficult. Although some institutions do have committees responsible for design and development Ünlü found that much curriculum development takes place on an informal basis by individual staff members. Although a little out of date, if the findings of this previous study are still valid, it would also contribute to an understanding of the reasons for the lack of documented examples of curriculum representations as 'thinking tools' or 'collaboration tools'.

What role then could curriculum representation play in the process of individual or collaborative curriculum development? Turning to the educator workshop, we can explore some early findings from a curriculum visualisation workshop in which four educators from different institutional backgrounds were first asked to articulate the purpose of the programme – in whichever terms they saw fit – before visualising their programme's curriculum. This artefact then provided the focal for a discussion around the learnings about and opportunities within the curriculum design process in their institution. *Figure 4* presents a summary of the four participant's visualisations.

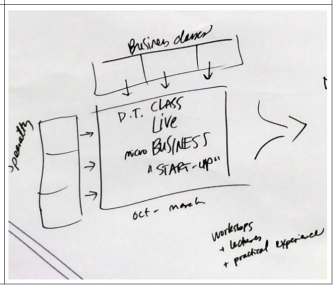
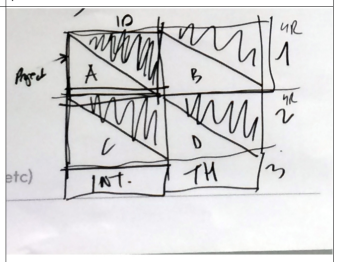
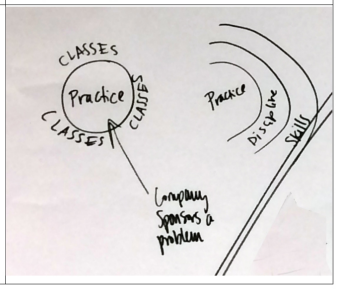
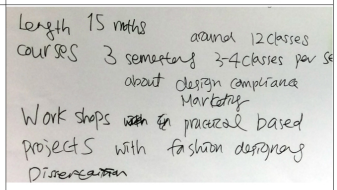
Educator 12	*Lecturer, MA Creative Industries and the Creative Economy, UK*	*Educator 13*	*Programme Leader, MA Industrial Design, Italy*
Programme purpose	"To create design thinkers for tomorrow's businesses"	*Programme purpose*	"To educate industrial design professionals"
Curriculum visualisation		*Curriculum visualisation*	
Educator 14	*Head of Design School, Jesuit University, Brazil*	*Educator 15*	*Lecturer, MA Fashion Design Management, UK*
Programme purpose	"Be aware of your impact on people and planet"	*Programme purpose*	"To bridge the management of business and creativity of design"
Curriculum visualisation		*Curriculum visualisation*	

Figure 4 Educator statement of programme purpose and curriculum visualisation

Educator 12, a lecturer on a UK business school's MA Creative Industries and Economy programme, described a curriculum structured around a 'design thinking' project in which students from multiple backgrounds were tasked with launching their own business in response to a shared thematic subject. Around this central device, a series of business classes and specialised design lectures were structured. Educator 13, the programme leader of an Industrial Design MA from Italy, described his role as educating future design professionals through a two-year programme of four studios in which practice-based projects of increasing complexity were introduced alongside theoretical classes. Educator 14, the Head of Design for a Jesuit University in Brazil, saw a strong relationship between the humanistic values of the institution and the role of the programme in educating for 'people and planet'. This curriculum saw a kernel of design project-based learning wrapped by supplementary layers of classes; from ethics and philosophy to skills workshops; an organising principle carried across all design programmes. Educator 15, a lecturer from a UK Fashion Design management programme described a schedule of projects and workshops across each semester that sought to blend business theory and design practice.

Reviewing these outputs it is possible to observe something about the nature of representations created. That is that in terms of the curriculum visualisation types framework introduced earlier, it seems that the default choice for educators was to represent their curricula in a subject-focussed (as opposed to context, or learner focussed) way. In addition, through observation of participants in discussions a number of other observations were made that could warrant further investigation.

Firstly, that the process of creating the visualisations themselves functioned well as collaboration activity, much better than an individual 'thinking' process. The shared dialogue between educators around the act of drawing and visualisation was observed – and recognised – as being more productive.

Secondly, that without a clear sense of institutional philosophy and purpose, the process of conceptualising and visualising the curriculum in any way other than a linear, or time-based plan is more difficult. For example, Educator 14 from a Jesuit University in Brazil revealed how the strongly humanist values propagated by the institution helped to frame the sense of purpose of the design programme and curriculum, versus Educator 16, who struggled to visualise the curriculum at all.

Thirdly, while the idea of visually presenting their curricula was new to all participants, it was felt to have value as a step in the curriculum design process, but also as a way of reflecting on 'the way things are now' and framing possible improvements to the curriculum and organisational context around it in future.

Conclusion

From this review of existing literature, discussion of educator interviews and an educator workshop, a number of conclusion and areas for further investigation can be identified.

While there is noteworthy historical evidence of the use of curriculum representations to communicate the overall arrangement of subjects and projects within particular educational contexts; it appears that their contemporary use has been neglected. From investigations with educators as part of this study it is possible to speculate on two possible reasons. Firstly, as design practice has broadened and definitions of design as a discipline changed it has become increasingly difficult to conceptualise and visualise the complexity of curricula in use today. Secondly, that without a clear view of educational values, the future of the design discipline or the future designer, it is difficult for educators to conceive of their curricula beyond simple time based schematics.

This paper establishes the potential of curriculum representation as an area for further investigation. By proposing a framework of curriculum representation types, a way of describing a broader range of function and focus for curriculum representation has been suggested. This framework opens up the possibility of widening their use beyond the communication of the curriculum subject matter, towards a role as boundary object in the curriculum design process, and a means to describe the context or learning journey of the education. In turn, this framework has been used to study existing curriculum representations and begin the process of collaborative exploring (with educators) potential new ways of representing curricula, both of which remain area for potential further study. Moreover, the use of curriculum representations – whether as sketches, drawings or

models – as 'thinking tools' in the curriculum design process of individual educators remains an area for further investigation.

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