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Cross-Cultural Collaboration for Curriculum Development of the First Women-Only Industrial Design Program in Saudi Arabia

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Abstract: This article presents a case study of cross-cultural collaboration. An Australian and a Saudi Arabian university collaboratively developed the curriculum for a bachelor of industrial design (ID) program at a women-only college of design in the Kingdom of Saudi Arabia (KSA). This article first describes the local context for which the curriculum was developed with a focus on how gender segregation shapes education and workplace in the KSA. Next, the literature review discusses cross-cultural aspects of design and contemporary ID education. We highlight the main results of a benchmarking exercise of current undergraduate ID curricula worldwide that we conducted before describing the planning process for the new curriculum at the local college. We then focus on the interpretation of the curriculum from an Australian to a Saudi Arabian context and discuss constraints and complexities in its development. The article also presents a reflection of the value of the cross-cultural collaborative process, our experience, and learning for both partners, and future collaboration and research.

Keywords: Cross-Cultural Collaboration, Curriculum Development, Industrial Design, Product Design, Saudi Arabia, Women-only Education

Introduction

This article explains a case study of cross-cultural collaboration between an Australian university and a university in the Kingdom of Saudi Arabia (KSA) for the development of the educational curriculum of the first bachelor of industrial design (ID) program at a women-only college of design in the Kingdom. To understand the complexities of this process a description of the Saudi context, for which the curriculum was developed, is essential. Moving from the local context, this article then discusses cross-cultural aspects of design and contemporary ID education in the global context. Two important steps in the curriculum development process were the benchmarking exercise of current, undergraduate (UG) ID curricula worldwide that we conducted to gain an adequate and up-to-date understanding of ID and related design curricula in the global context and the specific planning and development process for the new curriculum at the women-only college of design. We then discuss in detail the process and main aspects of this cross-cultural curriculum design, with an emphasis on the interpretation and development of the curriculum from an Australian to a Saudi Arabian context, and the constraints and complexities encountered. The article concludes with a reflection on the value of the cross-cultural collaborative process, our experience, and learning for both partners and future collaboration and research.

Women in Education and the Workforce in Saudi Arabia

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Similar to bordering Gulf countries within the region, Saudi Arabia experienced major economic, social, and political change due to the discovery and production of oil in the 1930s. This societal change also impacted on the role and rights of women in education. Today, women in Saudi Arabia are actively seeking higher education as part of the country's social, economic, and cultural development. Women's education has witnessed an unprecedented development in the past sixty years and is "highly valued in Saudi society" today (Hamdan 2005). With more than 300 women-only colleges, in 2010 female students represented about 56.6 percent of total university students in the Kingdom (Ministry of Higher Education 2010, 9).

However, Saudi women's education experienced social and religious resistance before women were able to participate in Higher Education at this high level (Al Alhareth, Al Dighrir, and Al Alhareth 2015). Al Alhareth, Al Dighrir, and Al Alhareth (2015) and Hamdan (2005) found gender-based roles stemming from religious beliefs and social practices to be the main obstacles for women's education. Hamdan (2005) argues that to understand the situation of Saudi women in general, one must look into historical, social, and political settings of the society. Le Renard (2014) points out that, from a historical perspective, education is considered the first gender-segregated public sector imposed by the government up till now. Le Renard further found that although the curriculum itself was identical in male and female educational systems, the aim of the female primary and secondary education was to provide girls and young women with skills that were "compatible with family life" by means of adding "home economics" as a gendered subject (2014, 37). Alhabidi likewise describes how traditional tribal and religious practices directly shape the status of Saudi women and resulted in local perceptions "that higher education is more relevant to males than females" (2013, 51). Education evolved significantly between the 1960s and 1970s when female students were encouraged to pursue higher education. By the mid-1970s, female college campuses had been opened in most major government universities and were synonymous to "a city within a city" (Le Renard 2014, 38). Today, the all-female campuses are equipped with communal amenities including cafeterias, parking areas, libraries, auditoriums, prayer rooms, and exhibitions.

Although the number of female students in higher education has increased so dramatically since 1930, the ratio of Saudi women in the work force does not reflect this increase. Hamdan attributes this problem to social and religious restrictions, including gender segregation as well as traditional "conservative views on women's participation in nation building" (2005, 7). However, the Saudi government has taken encouraging steps to include women in the workforce on two levels: national and international. Through signing three international conventions, including the United Nations Equal Remuneration Convention, the United Nations Convention on the Elimination of all forms of Discrimination Against Women (CEDAW), and the International Labor Organization's Discrimination Convention, Saudi Arabia provides grounds for women to join the workforce regardless of gender (AlMunajjed 2010, 7). At the local level, AlMunajjed (2010) found that the local government has made use of national initiatives to include women in the workforce such as the 2006 labor code that allows women a two-year paid maternity care leave and provides day-care centers in government buildings to cater for children of working mothers. The government also launched seventeen technical women-only colleges in different parts of the country to train younger generations with labor market skills (AlMunajjed 2010). Nonetheless, despite the success of these initiatives to include women in the workforce, cultural restraints including "social, legal, educational, and occupational" prevent Saudi women from fully benefiting from such initiatives (AlMunajjed 2010, 10).

More recently, as part of Saudi Arabia's Vision 2030, the National Transformation Program 2020, launched in 2016, explicitly mentions the empowerment of women as one of its strategic objectives.The program aims to "[e]mpower women and materialize their potentials" (Saudi Vision 2030 n.d., 33), as a relevant Vision 2030 objective, along with increased job opportunities for women in the private and civil service. The National Transformation Program sees the need for development of particular mechanisms to improve women employability. Currently, women

represent 22 percent of the workforce, while the suggested target for 2030 is 30 percent (Saudi Vision 2030 n.d.). The design and implementation of a women-only ID curriculum for higher education aims to make a contribution to these desirable developments in an area primarily seen as a male domain (see also Stracke, Oerlemans, and Montana-Hoyos 2017).

Moving from the local to the global context, the next section reviews related literature that focuses on culture, design, and ID education in the international context, used as grounds to develop the ID curriculum for the female-only college of design in the KSA.

Culture, Design, and Design Education

As Parrish and Linder-VanBerschot explain, "teaching and learning are not only embedded in culture, they are cultural transmission in action—the means to culture" (2010, 5). Culture, education, and design are closely interrelated. Fincham and Rhodes (1994) explain that "culture is an anthropological term referring to the fundamental values, beliefs and codes of practice that make a community what it is. The customs of a society, the self-image of its members, and the things that show it as different from other societies constitute its culture" (quoted in Razzaghi and Ramirez 2009, 440).

Cultural aspects are of great relevance for the various disciplines within design (such as architecture, landscape architecture, interior design, graphic design, ID, and others), both in practice and in education (Montana-Hoyos, Scharoun, and Poplin 2015). In the design disciplines, culture is understood through the study of artefacts made and used by people in their context. Design then is an active creator of culture and meaning, though some authors suggest that globalization has caused homogenization in design, as well as standardization of design education (Norman 2012). They suggest that design curricula around the world have become almost identical. Furthermore, after analyzing responses from twenty-two participating ID programs worldwide, Razzaghi and Ramirez (2009) found that most design programs suffer from a lack of subjects related to the links of design and culture.

Yet globalization offers increasing opportunities where cross-cultural exchanges occur more frequently. Fries distinguishes the terms cross-cultural and multicultural. She explains that "cross-cultural" applies to more than one culture (i.e., a cross-cultural comparative study). Multicultural, when referred to a society (such as the Australian one) or context, is associated with a melting pot where different cultures coexist (Fries 2003). In those terms, our project is best described as a cross-cultural collaboration for the development of the ID curriclum, between a Saudi Arabian College of Design and an Australian university.

Contemporary Industrial Design Education

Contemporary ID has dematerialized the product, moving from the traditional design for manufacture (DFM) approach to one having as its aim the design of systems, services, and user-experiences. Furthermore, new technologies have allowed ID graduates to practice as digital makers, game and app designers, and others. The scope of ID education and jobs involves diverse disciplines with "softer" aspects of design (Trathen and Varadarajan 2013). The change in scope of ID practice influences the educational needs and practices of tertiary education, placing an increasing importance on design research as part of the curriculum. Contemporary ID education has multiple foci, which vary according to culture and geography (e.g., Connor and Beckwith 2014).

With the introduction of softer design approaches and the contemporary relevance of design thinking and multidisciplinarity, many variations of ID related design programs have also been developed worldwide, sometimes with different names or branded as multidisciplinary integrated design and innovation programs. ID ranges across the arts and the sciences in a broad range of programs and curricula. It is also sometimes equated to similar programs (such as product design, product design engineering, industrial design engineering, etc.). To ensure that the specific ID

curriculum for the College of Design in Saudi Arabia would meet global standards as well as local education quality assurance standards, and the needs of the local college and the students, the next two sections describe the main steps undertaken.

A Global Benchmarking Exercise on Design Education

As discussed in a related paper (Montana-Hoyos et al. 2016), to gain better understanding of contemporary ID and related design curricula worldwide, a review was conducted of sixty top design schools, extrapolated from the top design school lists presented in *Businessweek* (2007) and *Business Insider* (Dickey 2012). Six representative examples of three-, four-, and five-year UG programs were selected, while also considering geographical diversity (Asia, Europe, Latin America, and the USA). To further understand and compare different ID and related programs, some of the aspects that are relevant and we considered included: 1) duration and credit requirements, 2) program aims and learning outcomes, 3) program characteristics, 4) program structure, 5) career prospects, and finally 6) professional recognition. Figure 1 below summarizes the findings, showing how traditional and contemporary approaches to ID vary from the aesthetically oriented art disciplines to the technologically focused engineering disciplines. Furthermore, some of the most recent and successful design institutions, such as the D-School from Stanford, are connected with business disciplines.

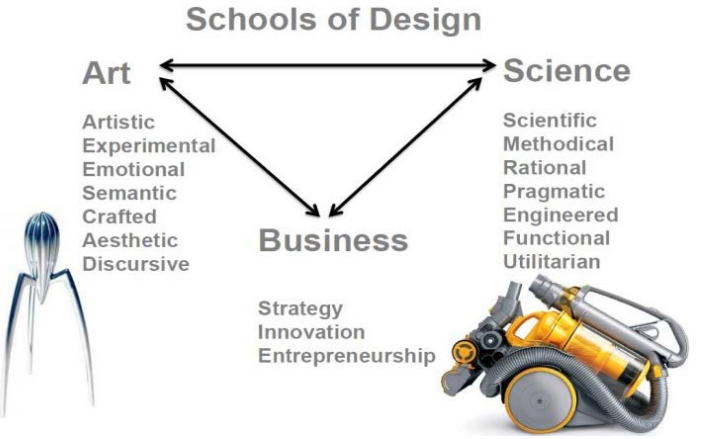

Figure 1: Approaches of ID-related Design Schools
Source: Montana-Hoyos et al. 2018

Different countries, their manufacturing industries, and their needs are reflected in the different design curricula, although some schools continue to follow the now classic principles of the Bauhaus and the Ulm School. While in developed countries many ID programs focus on the design of products, in many developing countries in Latin America, Africa or South-East Asia, ID also has a tradition related to the crafts, supporting traditional artisans. Australia is known for a DFM approach, with a very hands-on and technical background and an emphasis on "making."

The range of UG ID programs equivalent to a bachelor's degree varies from three-year programs to five-year programs, with a four-year program being most popular. While we found many variations in ID curricula, below are some of the most common program structures. Furthermore, many countries, including Australia, have technological or vocational education providers or private institutions, which offer ID programs ranging from two to three years, which can allow for articulation to further studies at a university.

- Structure 1: Three-year UG plus one-year honours as separate degree (recently adopted by some Australian universities)
- Structure 2: Three-year UG plus two-year compulsory masters (European Bologna model)
- Structure 3: Four-year UG (with embedded honours or capstone course)
- Structure 4: Five-year UG

Due to the requirements of the KSA higher education body, the curriculum was developed as a five-year UG program, similar to Structure 4 above, including an initial Preparatory year. Incidentally, the most similar curricula were found in Latin American universities. These findings, plus a co-design process and continuous consultation with the Saudi Arabian college Dean, program coordinator, college academic committee, and future potential employers formed the basis of this multidisciplinary and cross-cultural project, where ID and language educators, curriculum developers, and educational technologists from different cultural backgrounds collaborated.

Planning and Developing the New ID Curriculum

To meet local requirements and needs, it was important to consider the broad range of career paths ID graduates follow today and extrapolate these to define a professional profile of the female graduates of the Saudi Arabian College of Design. Diverse aspects such as cultural and religious considerations and the profile and strengths of the university, among others, had to be considered. In consultation with female staff from the college and potential local employers about the needs of industry and job scopes for future female graduates, we could define the mission and vision of the ID program that would have a strong engineering focus. Interestingly, this was somewhat contrary to our initial perception of what a women-only ID program in this context could be. A strong emphasis in entrepreneurship and strategic design was also important, and it is expected that these will play increasingly important roles in future developments. Given the literature review and the important role of design and culture (see above), we also purposely included some dedicated courses that explore the roles of Saudi Arabian cultural identity and history, as applied to ID and related crafts. Below we describe the process and key aspects of this cross-cultural curriculum design.

Constraints and Complexities in the Development of the Design Curriculum

Cross-cultual curriculum design is always difficult; often there are complexities around understanding a different system and the curriculum goals—broadly, as described above, or in detail. In this section, we explain essential details—particularly some of the constraints that were run up against—and conditions that had to be considered (American Association for the Advancement of Science 2001), such as the number of credit hours a class should run for (number of contact hours per week as well as hours of private study) and assessment items—for example, each course had to include a 5 percent attendance mark, not a common requirement in Australian universities. We discuss here the expectations for completing the various sections of the curriculum documents: the different interpretations of Bloom's taxonomy (Bloom et al. 1956), the differing use of constructive alignment (Biggs and Tang 2011), and cultural perspectives on knowledge construction (Boyer 1990).

Understanding Bloom in the Context of the Saudi Arabian National Quality Framework

Saudi Arabia has an explicit set National Quality Framework (NQF) for accrediting and assessing their national qualifications in the higher education sector. The National Commission for Academic Accreditation and Assessment (NCAAA) provides guidance on the development of

curriculum, which ensures a rigorous approach to quality assurance. The NQF also ensures that qualifications accredited by the NCAAA lead to the "knowledge, generic skills and professional expertise" associated with studies from comparable awards globally (2009, 2). Explicit in the NQF is an understanding that the curriculum specialist should utilize what is known as Bloom's Taxonomy, particularly drawing on the three domains of learning Bloom and his team developed: the Cognitive, Affective, and Psychomotor Learning Domains (Bloom et al. 1956). However, what was not initially clear was how Bloom's domains translated to the five NQF learning domains to be applied across the four-year program: 1) Knowledge; 2) Cognitive Skills; 3) Interpersonal Skills and Responsibility; 4) Communication, Information Technology, and Numerical Skills; and 5) Psychomotor Skills. These five learning domains are considered the essential components of an effective curriculum in the KSA and must be demonstrated throughout the program as well as the individual course level (NCAAA 2009).

Table 1: Comparison of Bloom's and NQF Domains of Learning

Bloom's Taxonomy		*NQF Learning Domains*
Domain of Learning	*Categories*	
Cognitive Domain	Knowledge	1. Knowledge
	Comprehension	
	Analysis	2. Cognitive Skills
	Application	
	Synthesis	
	Evaluation	
Affective Domain		3. Interpersonal Skills and Responsibility
Psychomotor Domain		4. Psychomotor Skills
		5. Communication, Information Technology, and Numerical Skills

Sources: Data Adapted from Bloom et al. 1956 and NCAAA 2009

In working through some of the guiding presentations developed by the NCAAA (Maffet and Murshid 2012), it became apparent that the NQF learning domains Knowledge (1) and Cognitive (2) Skills were split across two of Bloom's (1956) Cognitive domain categories (see Table 1 above). The Affective domain was redefined as Interpersonal Skills and Responsibility (3). Psychomotor (4) was defined in the same way for both sets of learning domains, while Communication, Information Technology, and Numerical Skills (5) formed an additional fifth learning domain to be included in the curriculum design that has no equivalent in the Bloom's Taxonomy (NCAAA 2009). A different approach was also noted in the use of constructive alignment for curriculum design in both countries.

Differing Approaches to Constructive Alignment

The use of constructive alignment in Australia is not dissimilar in the KSA (Biggs and Tang 2011). However, the Saudi curriculum has a stronger focus on learning outcomes and assessments that are measurable, observable, meaningful, and independently verifiable: "student assessment processes must be appropriate for the intended learning outcomes and effectively and fairly administered with independent verification of standards achieved" (NCAAA 2009, standard 4; see also Maffet and Murshid 2012). The differing approaches to constructive alignment added a level of complexity not often seen at universities in Australia. Further, in the development of the curriculum, greater attention was placed on the development of assessment—a reversal of how constructive alignment is typically used in Australia. Here teaching methods

and activities are set prior to the design of assessment tasks, which forms the final piece of the curriculum puzzle (see Figure 2 below).

From the instructions given (Maffet and Murshid 2012), it became clear to the Australian team that in the Saudi Arabian curriculum design, the teaching strategy and methods were dependent on the assessment methods as the final piece of the curriculum puzzle—this is more in line with curriculum design known as "backward by design" (Wiggins and McTighe 2005), in which assessments are designed first and the teaching methods are decided afterwards (Montana-Hoyos et al. 2016). While this practice of curriculum design is gaining prominence in the United States (Fox and Doherety 2012), it is not frequently utilized in Australian universities, where the focus is still strongly on Constructive Alignment. Figure 2 below shows the two approaches. While different, the result for both is the development of a coherent curriculum in which program learning outcomes, assessment methods, and teaching strategies are aligned and meet student-learning needs.

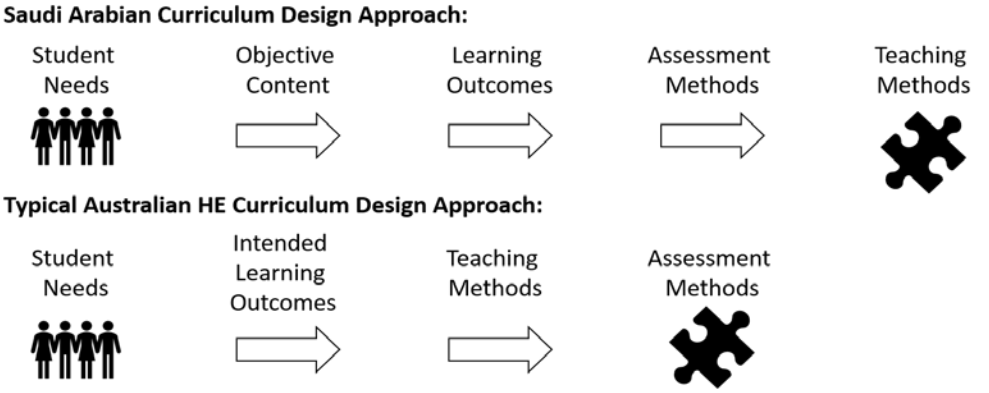

Figure 2: Curriculum Design Approaches in the KSA and Australia
Source: Montana-Hoyos et al. 2018

Note, in Figure 2, the difference in approaches to learning outcomes—Australian universities typically look for the "intended" outcomes, recognizing that there may be unintended but desirable outcomes from the teaching of a course of study (Biggs and Tang 2011). Further, in Australian higher education, content objectives are not included as a focus of curriculum design; it is assumed that the appropriate content knowledge will be covered. What is given greater prominence, and often reflected in graduate outcomes at the university level in Australia, is the ability for students to be able to engage in higher-order thinking skills, which is driven nationally by the Australian Qualifications Framework (AQF). This framework requires a UG degree to produce graduates who have well-developed cognitive skills, with an ability to analyze, evaluate, and transmit solutions (AQF 2013). For the Australian team, the understanding that content knowledge was a primary focus of the KSA Knowledge domain helped write these more specific learning outcomes at the course level.

Cultural Understandings of Design Knowledge

A final hurdle was the different expectations and understandings of how design knowledge is taught and learned. The KSA NQF focuses strongly on knowledge as content and divides it into application, or "doing," and theory. The divide between application and theory is not an uncommon problem when working with professional disciplines in the university sector that typically view knowledge production and its application separately (Griffiths 2004). Thus, when the initial studio courses were submitted for accreditation and review, the Saudi reviewers commented there was too much theory in them. Saudi partners view studios as courses where

students "do" design work, the application of theory only—hence the emphasis on the Psychomotor domain.

However, at the Australian partner university, the pedagogical approach is design thinking, focusing strongly on Boyer's (1990) scholarship of application. This approach to teaching and learning moves more toward knowledge as engagement. It brings together "knowledge-as-theory" and "knowledge-as-practice" in a dynamic way where theory and practice vitally interact, and one renews the other. The integration of theory and practice is considered a strength of the pedagogical approach to teaching and learning in design education. It is an iterative approach, which encourages students to engage in moments of divergence (engagement in the cognitive processes of theoretical and creative exploration) and convergence (times for application, engaging in the design resolution and its communication) (Brown 2009; MacKenzie, Oerlemans, and Muminovic 2017). Through this process, there is a constant moving between theory and practice in response to the design project brief. It encourages clarification and reworking, testing of ideas and methods, and the exploration and integration of the fields of history, the fine arts, and design theory (Griffiths 2004; Tonkinwise 2014), but it also creates the spaces for the local context (MacKenzie, Oerlemans, and Muminovic 2017).

The result of the Australian team's deliberations was that although some minor changes were made in response to the feedback, it was decided to continue to develop the curriculum in this way, as this best met the underlying design approach adopted (as described above). The intent was to continue to create the spaces for the unique Saudi Arabian context and culture and provide for the inclusion of the local art and craft scene, local industry participation, and access to the rich Saudi history in furniture design. The curriculum designed would provide opportunities leading to valid new and local knowledge production (Griffiths 2004). It would encourage the development of ID projects more attuned to the Saudi Arabian culture and context, and introduce opportunities that would empower females to create their own "design-related" businesses, as established in the original curriculum program goals.

The Value of Cross-Cultural Curriculum Design

The process of developing the curriculum for the first women-only bachelor of ID program in Saudi Arabia has been a valuable experience. We believe that both partners, the Australian academics and their Saudi counterparts, have learned through this unique project and cross-cultural collaboration. In this section, we will highlight three instances of our learning that have complemented the actual task of ID curriculum development before describing some proposals for future collaboration and research.

First, what the Australian academics considered to be a major difference and challenge when the project started—that is, the gender segregation in the Muslim context—turned out to be less of an obstacle in the development phase of the curriculum. It is important to remember that while gender-mixing is common in the private lives in Saudi Arabia, segregation is expected in public, and this includes universities such as the Saudi university in this project. In this context, Australian colleagues questioned the ethics of the project. For instance, the Australian team members were questioned on whether the project would not reinforce the existing segregation, a practice uncommon in Western countries. While such concerns are understandable, the Australian team has seen the collaboration not only as an opportunity to contribute to design education in general, but also to enable young Saudi women to study ID in their country. This will open new career pathways, empowering these female students.

Second, the team's multidisciplinary and cross-cultural approach helped the Australian team to complete the task to the satisfaction of the Saudi partner. The project required a project team that had expertise across ID, curriculum development, and language and culture. None of the project team members could have developed the curriculum on their own. Working with academics from different disciplines is without any doubt a rich learning experience for all

involved because multidisciplinary collaboration challenges boundaries and invites us to think across them. Further, continuous communication and exchange between the Australian and the Saudi partners were necessary to develop a curriculum that would meet the profile and needs of the students in their particular context to promote a shared vision and common goals. Crossing the boundaries of global collaboration, the establishment of guiding principles for action directed by the NCAAA format required a significant level of commitment from involved parties at an institutional, departmental, and faculty level.

For the Australian team members, having an open mind and a willingness to learn about the cultural and religious context in the KSA were vital for this project. There were restrictions—for instance, in the way a male Australian colleague would communicate with female staff at the College of Design during his field trip to the KSA—but such challenges could be overcome. Moreover, while gender segregation is the norm within Saudi educational institutions, industrial field trips to local manufacturers outside the university were not segregated. The program team visited the first and second industrial cities in the Dammam Eastern province, meeting with industrial male and female professionals, which attested to graduate job opportunities. Such field trips provided an essential platform for a dialogue between higher education institutions and sector-specific labor opportunities. Without any doubt, this project challenged all members to go beyond their "usual" ways of thinking and doing.

Finally, both partners benefited from this collaboration beyond the curriculum development project that we present in this article. From the Australian team's perspective, developing a curriculum for another university in a different cultural context has allowed us to critically reflect on the ID curriculum at our university. For instance, the Australian curriculum has benefitted from the international review conducted and the curriculum development project through the recent inclusion of softer approaches to ID (service and user experience design), a new emphasis on business and entrepreneurship aspects of design, and studio projects that include exploration of Australian cultural identity. Similarly, the Saudi cultural identity is reflected in the Saudi program mainly through two study courses: "Crafts in Saudi Arabia" and "Industry in Saudi Arabia." Saudi Arabia's educational priorities recognize the importance of local cultural values and interests to develop new understandings of education and, at the same time, preserve cultural traditions. Consequently, it is vital that the ID program trains students to work in local communities, providing courses and fieldwork that address modern-day local problems and interests from social and cultural perspectives. Through this collaboration between Australia and Saudi Arabia, we learned that courses that focus on cultural identity allow graduates to better understand and apply their training in native communities as opposed to mainstream communities and institutions.

The College of Design at the Saudi Arabian university started teaching their first cohort of female students in late 2015. Collaboration is ongoing, and both partners wish to explore and understand how the ID curriculum is being implemented in the women-only college of design. The initial project has triggered many questions—for instance, how should the college approach human body drawings and measurements, in view of cultural and religious practices? For example, while western books of human body measurements and anthropometric studies exist, related in-class excercises, such as having students measure their own bodies, would in this context be women-only. How will the curriculum and the program evolve in the particular Saudi context? The project team envisages several research projects such as the evaluation of the current curriculum and further development for the ID UG program, a master's program, and/or further comparison of ID curricula across cultures. Other projects will look at curriculum development as policy, and qualitatively explore the female students' career aspirations within foreseeable career paths. Saudi Vision 2030 (n.d.) states:

> Saudi women are yet another great asset. With over 50 percent of our university graduates being female, we will continue to develop their talents, invest in their productive capabilities and enable them to strengthen their future and contribute to the development of our society and economy (37).

While much work lies ahead, we believe that an international, collaborative project, such as the one described in this article, has the potential of addressing interpretations of curriculum development in higher education that are equally aware of cultural differences. It can help achieve these goals through providing a better understanding of ID education within the local context, through an international, global perspective. Working toward creating a dialogue that involves a cross-cultural exchange of educational concepts and frameworks has turned into an innovative, international research partnership between curriculum developers and designers, the social sciences, and industrial stakeholders and local crafts persons.

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