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ESTABLISHING AND LEVERAGING NETWORKS IN DESIGN EDUCATION INNOVATION PROJECTS

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ABSTRACT
Project networking is the practice of obtaining needed services, ideas, or content by soliciting contributions from individuals, groups and organisations external to a project's core team. The ability to establish and leverage networks is an increasingly important component of developing open innovation practices within many industries. This research examines the strategies and tactics employed by multidisciplinary undergraduate and postgraduate students to finding, forming and utilising idea-supporting networks. Three academic institutions, Northumbria University, Hong Kong Polytechnic University and The University of Technology Sydney, brought together a multidisciplinary collection of students and academics to explore hand hygiene solutions in their respective domestic culture and a foreign culture. While each of the student teams aimed to produce design research that uncovered opportunities for social benefit and profit, the project concurrently sought to explore two research questions: 1) what approaches to establishing networks in innovation projects emerge during a globally connected educational programme and 2) what value is leveraged to support project development? This research builds on work about Open Innovation Networks focusing on idea development and reports findings about innovation enhancement and innovation suppression that emerged as a result of distributed digital design research.

Keywords: Innovation, Networked Intelligence, Multidisciplinary, Project Networks

1 INTRODUCTION

There is a growing body of work examining open innovation in business [1] and open innovation as a cultural practice. Some of this work includes: how to build innovation networks [2]; case studies identifying the innovation potential of networks to aspects of a value chain [3]; Living Labs [4]; networks that are utiliser-driven, enabler-driven, provider-driven and user-driven [5]; and networks for discontinuous innovation [6]. Network Innovation refers to innovation taking place in networks of people and organisations and is one of the goals of open innovation, which is fundamentally a self-organising model, because the open innovation network and its operation build on voluntary collaborations. One of the promises of product development that emerges from genuine connections to communities of public are innovations that have a superior match with user needs and can be up-scaled promptly to the global market [5]. It is recognised that developing successful network innovations includes three distinct and significant challenges: finding the right partners, forming relationships with them, and then building high-performing networks [6]. This study is set in the context of a technologically mediated globally distributed multidisciplinary educational project, where teams of undergraduate and postgraduate students aimed at innovating with soap to improve hand-hygiene while exploring business model implications.

2 THE RESEARCH CONTEXT

The primary study this paper reports on draws from a technologically mediated collaboration between three academic institutions. Two of those institutions were represented by multidisciplinary Masters programmes: MA/MSc Multidisciplinary Innovation, Northumbria University (NU) and MDes International Design and Business Management, Hong Kong Polytechnic University (HKPU). The third partner was a group of students from the Bachelor of Design (Industrial Design), University of

Technology Sydney (UTS). 58 students represented those programmes and were supported by a core team of 11 academics. The project brief asked students to investigate and understand hand-washing behaviours, routines and rituals and two regions (HKPU – Mainland China and Hong Kong, UTS – Australia and S Korea, NU – UK and Brazil) and based on insights from primary and secondary research to create innovative 'localised' solutions to fit the organizational context of a (named) multinational FMCG. The challenge included identifying an area of societal behaviour that could be modified through behaviour change and lead to improved hand hygiene habits. In order to achieve these project goals the teams were encouraged to connect with people and communities living in or connected to their project context to explore issues and solutions. The project ran over a 7-week period and progress was periodically shared to review the phases of research, insight development, ideation and final pitch. A project space was set up using Google+ accounts and pages, which exposed each team to the activities, networks and insights being established by teams in each institution.

The researchers expected that in this study the student groups would identify and establish connections with: prospective user groups after identifying a particular problem context; people in the medical profession or medical professional bodies to deepen their understanding of the implications of different hand-hygiene practices; and to develop connections and contacts with cultural knowledge of their non-domestic areas of context (South Korea, People's Republic of China and Brazil), including but not exclusively NGOs actively serving in or studying the low-income social stratum in selected regions of these nations. In order to be pragmatic, the researchers anticipated the student teams to: (a) form a shared network to help understand the situation and define the problem(s); (b) refine that network for developing ideas or solution conjectures and then; (c) access a network of expert and lead-users for testing and developing concepts. It was anticipated that this network's reach would be exercised by connecting to particular online communities or discussion groups – related to target consumers and cultures – via the known social-networking platform(s) in the Internet.

3 THE RESEARCH PROCESS

This research includes the planning and running of the collaborative project as this work was informed by the researchers and influenced the data collected and reported here. However, in order to answer the research questions a discrete data collection and analysis process was followed using the 'Innovating with Soap' project as its primary source. This research had five steps in its process:

(1) Network Map Production: Reflective interviews with representatives of each of the project's teams were conducted. During these interviews network maps were draw up by the interviewer in real-time. The interview consisted of guiding the participants through a reflection on their project activities, primarily chronologically. These guided reflections required the students to describe who they connected with, outside of their immediate teams, how they connected to those individuals, groups or organisations, what type of project activity those contacts feed into and the value of the connection to the project's development. This information was mapped and coded, illustrating chains of events that lead to successful or unsuccessful contacts being established and leveraged. This step involved 13 interviews with 46 project participants. 8 of the project's participants where not present during the interviews however, each team, when asked, felt that they had accurately portrayed the team's activities and network during the interview. This was confirmed by cross-referencing the information in the maps against the project's development materials, which were captured on a Google+ project page.

(2) Data Selection and Cleaning: Individual data pieces were identified and re-presented to ensure consistency in data presentation. The data presentation describes the journey to establish a contact and the value the contact represented. Data piece NU_T1_N7 (Institution_Team_Data Piece) serves as an illustration. This particular story began with the website http://www.theanswerbank.co.uk. The students searched, 'make contact with people in Brazil' and through this site identified http://www.interpals.net, which is the linking organization to establishing a network contact. Using http://www.interpals.net and a search for Brazil, eight individuals were identified, written to and invited to be involved with the project. Three of these responded positively and one became a project contact. That individual was linked to a project Facebook group and a number of Skype interviews were held where the project team sought to better understand life and culture in Brazil. This successfully contributed to the team's understanding of the project context and situation. However, the contact was not maintained and

was not invited to co-create ideas as part of the team or asked to review and feedback on ideas that were developed. Once cleaned the data piece was presented in the following manner:

Data Code: NU_T1_N7
Original search location: http://www.theanswerbank.co.uk
Search Parameter: 'make contact with people in Brazil'
Linking Organisation: http://www.interpals.net
Number of potential contacts identified and contacted: 8
Respondents: 3
Contact established: Female_24
Contact Dialogue: Facebook & Skype
Project Value: Cultural Knowledge
Solution Co-creation: No
Solution Validation/Feedback: No

(3) Data Clustering: The purpose of this step was to organise the cleaned data pieces into clusters to identify different routes to establishing project contacts. Reviewing and clustering the data pieces identified two distinct network activities: utilising existing personal and professional networks and using project content searches to establish new personal and professional relationships. This research step divided those two channels to cluster data under the following headings: Amenable Personal Networks; Networked through Friends and Family; Content Connected Friends and Family; Trusted Personal Networks; Trusted Professional Networks; Linking Organisations; Content Searches; Direct Approaches; Related Organisations; and Publishing.

(4) Cluster Analysis: Each cluster was examined to identify expected, best practice and novel approaches utilised to establish, extend and leverage the network.

(5) Data Review: A Masters project, 'Town of Colour', from the 2013 academic year completed at Northumbria University by the MA/MSc Multidisciplinary Innovation cohort was identified by that programme's academic team as exemplary for the project network that was found, formed and utilised. The project's manager, from the student cohort, was interviewed and project materials reviewed to produce a network map using the same procedures as Innovating with Soap. This data was positioned against the Innovating with Soap project data to highlight missed opportunities to find, form or utilise project networks.

4 DATA EXEMPLARS

The research process materialised the Innovating with Soap project network. It allowed the researchers to identify exemplar approaches to utilising existing and establishing new personal and professional connections. These exemplars are not intended to be exhaustive but are useful in illustrating the students' ability to generate value for project development by extending the reach, knowledge base and expertise of their respective team.

4.1 Data Exemplars, Utilising Existing Personal and Professional Connections

To utilise and extend existing personal and professional connections four approaches emerged, which were: (1) invitations to join and work with or as part of the project team offered to trusted family and colleagues, (2) direct approaches to close project content connected individuals, (3) trawling amenable online social networks, and (4) requests and offers to be networked by close and trusted colleagues, friends and family to content relevant individuals, either by a direct requests or by taking opportunities to expose project development to interested parties (anyone who would listen).

Exemplars of utilising existing personal and professional connections were:

(1) Invitations to join the project team (a) a team member's boyfriend, who has 10 years experience in product development, joined the major weekly project development sessions and made contributions across the full range of project activities; (b) a team member's niece and family (who was representative of the solution's target user) were filmed and involved in prototype testing and reviews; and (c) a team member's mother and wife were involved in scenario development after producing project specific photo-diaries.

(2) Direct approaches to project content connected individuals (a) a team member's friend was a work supervisor in a shoe factory and they helped gain access to tour the factory and conduct interviews with the female workers (which was this team's intended user group); (b) a number of the teams approached an associated visiting Professor with particular expertise in design,

innovation and soap to supply specific knowledge about the project's key technology; and (c) a team member's aunt, a nursing director in the UK's NHS, was contacted and willing to help but was never used.

(3) Trawling amenable online social networks (a) Project questions and challenges were posted on team members' Facebook wall, those who responded were then invited to join a Project Facebook group which discussed and reviewed problem descriptions and solution proposals; and (b) surveys were produced and sent out across 'friends' via social media (Facebook and QQ), while response numbers were generally high the results were not particularly directive for the project's development, however, at its best the responses allowed insightful or helpful individuals to be identified occasionally leading to focus group invitations/activities.

(4) Requests and offers to be networked (a) a team member's father had a friend who knew a local government official, this individual helped the team gain access to and visit a low-income community in PRC which led to the team conducting 20 interviews and a number of day-in-the-life photo diaries; (b) a programme tutor identified a Brazilian national on an associated design programme, positive contact was establish but the individual was never engaged in the project; (c) a programme tutor identified a PhD student working in-field in a region associated with low-income (and assumed low hand-hygiene), this led to interviews with the doctoral student and their supervising Professor, which then led to the identification of project related NGOs, these NGOs were however never contacted; and (d) one team produced a project blog to attract interested persons to contact and contribute to the project.

4.2 Data Exemplars, Forming New Personal and Professional Connections

Three approaches emerged for finding and forming project specific connections not associated with any existing personal or professional contacts, these were: (1) through linking organizations, (2) through digital content searches, and (3) by direct physical encounters.

Exemplars of establishing new personal and professional connections were:

(1) Using linking organizations (a) through, http://www.interpals.net, an individual based in Brazil was connected to, interviewed and invited into a project Facebook group, the contact was not maintained beyond the initial interviews; (b) search results from, http://ilas.sas.ac.uk, led to 7 UK academics with research expertise in Brazil, one of which referred the team to his wife who was an expert in the project area of interest and whom agree and contributed to context understanding; and (c) the Brazilian Embassy in the UK was contacted and a list of Brazilian societies based in the UK and NGOs working in Brazil were provided, non of those were pursued.

(2) Using digital content searches (a) searching 'poverty in Brazil' returned a number of interesting and useful blogs, the sites' materials were used but blog authors never contacted (b) searching 'favela tours' returned an article on Rochina and a DJ school for children. Zenhzenhino, the DJ, was then found on YouTube, emailed, contacted, interviewed and he subsequently provided two further contacts for hygiene expertise in Rochina, who were not successfully connected to.

(3) Using direct physical encounters (a) to find and form new connections with female workers in PRC a team booked sessions with a massage therapist, interviews were conducted during the session, a bond established which led to the team's ideas being reviewed by these contacts via text message (b) deliberate and regular visits to a local restaurant resulted in friendly conversation with the waiting staff, this led to a series of interviews outside of working hours (c) visited a low-income community in HK and conducted on-street interviews, non of these resulted in any further contact.

5 RESEARCH FINDINGS

With consideration to previous Master level projects the network established by the students during 'Innovating with Soap' seems typical. The results of this study, examining the network's creation and utility, highlight both expected and novel behaviours and missed opportunities which raise interesting questions about the support and training students receive for project network management. The research findings can be considered within 5 areas, these are: Expected Network behaviours, Best Practice Network Behaviours, Novel Network Behaviours, Poor Network Behaviours, and Missed Opportunities to Leverage Project Networks.

(1) Expected Network behaviours - Existing personal networks are easiest to access and were most readily used. Anticipated and expected approaches to utilising and extending existing personal and professional connections were: using trusted family, friends and colleagues for discrete project activities; directly approaching individuals who have some knowledge relevant or connection to the project area or asking trusted connections for introductions to people they know; and trawling online social networks with blanket surveys. Evidence suggested that most of the project contacts established were used to fulfil an immediate knowledge gap to help understand the project situation and problem.

(2) Best Practice Network Behaviours - Teams that extended the involvement of individuals in the project exemplified best practice; teams that identified and involved relevant contacts for strings of activities as opposed to isolated activities: i.e. when a nephew and his parents were used in video production but also involved in product testing and evaluation. Some of the teams made valuable new connections through content searches and linking organisations that involved multiple steps and many communications to arrive to and connect with a relevant individual or team. As a result teams benefited from expertise and cultural knowledge not immediately available. The students valued this knowledge and the excitement of the hunt.

(3) Novel Network Behaviours - Teams that included family members regularly into project activities evidenced novelty in this area. Using online surveys to identify individuals interested and able to contribute to the project to form focus groups was also a novel approach. Personal and professionally trusted connections appear to ensure engagement in activities, as involvement is simply another aspect of a deep ongoing relationship.

(4) Poor Network Behaviours - Finding and forming new content specific relationships is difficult. For the students there was no obvious negative consequence to letting the lead go or maintaining the connection. The data showed that if instant gratification is not received or potential benefits not recognised then the effort to establish or maintain the connection outweighed its perceived value. Often contact was established but not maintained as the perception was that the contact was not useful for the most immediate tasks or knowledge gaps. Developing trust within the network is critical to increasing the opportunities to set-up project networks to co-develop, verify and test ideas. Trust is difficult to develop during projects with short time-spans particularly when communication is digitally enabled. None of the student teams had an approach for developing trust within their project network and none of the student teams discussed debriefing their contacts about the project's outcome or thanking them for their involvement.

(5) Missed Opportunities to Leverage Project Networks - In this project there appeared to be a lack of confidence in co-creation strategies, which was a significant missed opportunity. Establishing and managing a co-creative network was (as we discovered) always going to be difficult when working so remotely from each institution and for some project teams so remotely from their target culture. Due to the pace of the project many groups reverted to a more traditional user-centred approach relying on the core team's skills and knowledge as opposed to the collective expertise of a project network. While some aspects of co-creative activity did emerge with contacts from individuals' personal networks and with new project specific contacts it was surprising that the students from each of the three institutions did not use each other beyond the formal sharing sessions. There were opportunities to have greater dialogue and review of ongoing progress using the Google+ pages and other social media being used. Although difficult there were opportunities to use the creative resource by organizing cross-institutional co-creative sessions around linking hygiene themes that span cultural differences existing within the project. Rather than viewing each other as collectives working on the same project institutional competitive behaviours were observed. Opportunities to utilise expert knowledge by connecting to extensive networks of related NGOs were not taken and opportunities to connect to lead-users were missed; e.g., in this particular project there was the chance to connect with bloggers, which was missed.

Questions resulting from this study are: can co-creation strategies be effectively implemented when the network is internationally distributed and mediated through digital media; what pre-project planning is required to ensure networking opportunities and efforts match the project's scope, content and timeframe; what supportive tools could be developed to help student teams effectively manage, ensure ethical standards are adhered to and dissolve project networks; what teaching about developing

and utilising project networks do design and innovation students require to help them balance expending effort versus generating value?

6 CONCLUSIONS AND FURTHER WORK

Students aiming at innovation are very good, entrepreneurial at times, in the use of personal networks and in finding relevant and novel content specific connections. Students would appear to benefit from greater guidance and supporting tools, not only in how to best maintain and manage their project network toward and during co-creation, but also guidance in how to dissolve and disassemble the network during and after a project's completion. The evidence of this study suggests that students working on design and innovation-focused projects think of project networking as supportive of discrete design process activities. In this study that mindset resulted in poor network management and many missed opportunities to extend the value and input of connections once established. This work suggests that there is value in thinking about project networks as entities and outcomes in their own right with value not just for the immediate project but also, potentially, for ongoing creative work. This change of emphasis might lead to more effective searches to identify 'the right people and organisations' not solely to fulfil an immediate knowledge gap or task need but to support project development across the full spectrum of activities (and potentially across future creative projects). Extending this study research is planned involving a combination of product development and digital media SMEs in the UK and academic teams of students and staff. The work will explore the benefits and opportunities to enhance commercial advantage in product development through access to and use of the 'Crowd'. The project plans to co-create through open networks a digital platform to facilitate crowd-sourced and funded product development.

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