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Let the grunts do it! – studying the embedding of a multidisciplinary master education in an educational institution

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Abstract

Despite much attention interdisciplinary educations still struggle to make full foothold in higher education. This paper study how an interdisciplinary master education can become embedded in education institutions. Educational research and institutional theory is used to conceptualise the interdisciplinary aspect and institutional change work. The case, Innokick, is a new education introduced in Switzerland. The education recruit engineers, business economists, and design bachelors. Cross disciplinary collaboration is central in the education as is close encounter with external enterprises and organisations that provide tasks for the students. The students develop prototypes of applications, products, a business model and business plan. The research fieldwork encompassed interviews, study of documentation and participants' observation. The study show how relatively low rank employees, the grunts, is left with realizing a strategy of making cross disciplinary, cross institutional and research based education. In an entrepreneurial spirit the first semester showed how a strong culture developed yet many aspect under construction. Challenges include tightening the interdisciplinary teachers' team, overcoming mono-disciplinary cultures at the involved education institutions, strengthening research and future employment for the students of the master.

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1. Introduction

In many contexts the establishment of a multidisciplinary education is viewed as unusual and awkward. Yet the study of multidisciplinarity and multidisciplinary education is burgeoning, for example Reeves et al. (2011) in their review of interprofessionalism find over 100.000 references over a forty year period. And the number of cross disciplinary educations are substantial. Yet Terjesen and Politis (2015) in their recent praise for multidisciplinarity point at a number of institutional drivers within business schools that maintain and conserve an incumbent institution of discipline-based scholarship, where education and research come to work in silos (Terjesen and Politis 2015: 154). Moreover even if establishment of interdisciplinary educations become official strategy and therefore should be executed by high level management, it still might be left to operational people with limited resources to do it, i.e. to the "grunts" as strategy scholar Hrebniniak (2006) calls the employees, that business strategists tend to leave with the operational worries of implementing strategy.

The aim of this contribution is to study how an interdisciplinary master education can become embedded in an otherwise disciplinary oriented environment and how the embedding can trigger institutional change to support it.

We mobilize institutional theories of change and multiplicity to try and understand the process of establishing. We also seek support in empirical educational research on interdisciplinarity, interprofessionalism and multidisciplinarity.

The paper is structured as follows. The method covers both theory and empirical issues and opens the paper. Then follows the development of the framework of understanding combining theoretical approaches to interdisciplinarity with institutional theory, the findings, describing what was revealed during the empirical work, the discussion analyzing the findings and our conclusion.

2. Method

This contributions is explorative and emergent in character. The master education followed in still in its first cycle. An abductive approach is therefore applied, iterating between empirical fieldwork and theory and framework development (Alvesson & Sköldberg 2009).

The research field work has consisted of interviews, participant observations and documentation. Interviews and meetings has been carried out in the initialization phase in the spring of 2015. Mostly with the responsible manager, which is also the second author. During the first semester in the autumn of 2015, three responsible teachers including overall manager, four teachers, four students with different educational background, one education administrator, one representative of HES SO and one enterprise representative. Participative observation has been carried out during classes, and during a socalled innovation marathon a two day ideation seminar arranged as away day at a conference hotel. Documentation from and about the education has been collected during autumn 2015, including curriculum plans, obligatory evaluations, course material, students tasks and other material.

It is planned to continue researching the second semester and further, collecting documentation, doing interviews and observations.

The researcher and first author has been employed by HEIG VD and asked to carry out the evaluation of the establishment of Innokick. This impose limitations ad well as possibilities. Access to events and material are enabled and a full independent judgment is constrained. Here the first author have used his experiences from other educationals and research institutions as comparison, to enable sufficient distance to the phenomenon studied (Alvesson & Sköldberg 2009)

The study of institutional change in education should normally use a longer time perspective than we can here, which is a limit our resources. Also a study can potentially take a more general perspective than adopted here, for example explaining professional carriers as a consequence of a series of interrelated institution from childhood see Bilimoria and Liang (2012).

3. Framework of Understanding

The framework commence by discussing the concept of "interdisciplinary" and continue by embedding this in an understanding of institutional change viewing education as institutions. The section ends with a summary of the resulting framework.

3.1. Interdisciplinary curricula

The literature and approaches to interdisciplinary curricula and teaching is as mentioned vast (Reeves et al 2011) and nevertheless ambiguous and unclear. One approach to tackle this is to think of interdisciplinary curricula as a continuum (Applebee et al 2007). If adapted to higher education, their continuum range from "disciplinary correlated" , over "shared" to "reconstructed" (Applebee et al 2007:1005,6). In a disciplinary correlated curriculum subject area specialists share responsibility but develop and teach their disciplinary curriculum independently (Applebee et al 2007:1006). Applebee et al (2007) label that multidisciplinary, probably due to the tendency of disciplines running in parallel. In a "shared" their coordination is stronger and goals are correlated. In a "reconstructed" curriculum an interdisciplinary team may develop, blend and plan a totally new curricular domain that draws on concepts and addresses issues that span or even go beyond those of any of the contributing subject areas which involve dismantling disciplinary boundaries and creating joint interdisciplinary research to back the curriculum up (Applebee et al 2007:1006). However one can argue that an interdisciplinary curriculum is not an island independent of its institutional context. Sauzet (2015), indirectly supported by Terjesen and Politis (2015), indeed take interdisciplinary praxises further by pointing at four interlinked types of praxises in a context of a bachelor education institution:

First interprofessionalism is about making education, where practices of education can be interdisciplinary and establish mechanisms around how students become professionals through cross professional modules (Sauzet 2015).

Second interprofessionalism is about identity amongst first teachers, second students. It differentiates between the professionals that are open towards other professions, and those who are not and is thereby opposed to the idea of "mono-professionalism" (Sauzet 2015:324).

Third interprofessionalism is about teamworking amongst teachers, an interprofessional practice. This can be supported by an organizational practice enabling the collaboration.

Fourth interprofessionalism is for Sauzet (2015) about coexisting on a campus, about an institution as also a psychical place.

One can observe how Sauzet thereby emerge from a view where interdisciplinarity is primarily an educational issue into interdisciplinarity also becoming an instititutional issue. It one want to develop an interdisciplinary education then one need to change the educational institutions that the education are to be embedded in. This therefore lead to take a look on theories of institutions and institutional change.

3.2. Institutional change

Institutional theory defines institutions as: "Social structures that have attained a high degree of resilience… [institutions] provide stability and meaning to social life… Institutions are transmitted by various types of carriers, including symbolic systems, relational systems, routines, and artifacts" Scott (2001: 48). Institutions by definition connote stability but institutions *can* be changed, incrementally and in a disruptive manner (2001) and Thornton et al. (2012). Institutionalist theory thus explain societal order and change as non-rational, and prefer cultural socially constructed explanations. Institutionalist approaches conceptualise institutions as consisting of three types of elements: cultural cognitive, normative, and regulative. For long institutionalist theory have departed from viewing organisations as homogenous and stable (DiMaggio 1983), and probably most institutional scholars are interested in institutional change, pluralism and complexity understood as relations between multiple institutions. Central concepts are institutional work (Lawrence et al 2009, institutional logics (Thornton et al 2012) and institutional complexity (Greenwood et al 2011).

Higher education can be understood in several ways reflecting different basic institutions. Education can be viewed as a societal task and part of the basic rights of a citizen (Cort 2011). And/or it can be seen as a market demand for human resources. In this context institutions of knowing involves education system actors, teachers, students, companies and more. The higher education institutions have undergone substantial reforms in Europe the last twenty years, one significant change being the new role of the applied science bachelor educations institutions (university colleges, business school, polytechnics, fachhochschulen etc). They are for example today expected to operate as given science-based education in contrast to previously far more practice-based.

There is a resonance between the challenges of the institutional set up of higher education and the development of institutional theory and the change in activities and performance in the construction industry. Here we are in particular interested in the interplay between bottom up and top down dynamics, which usually keeps educational institutions together and also put them under pressure. More specifically the institutional work approach (Lawrence et al 2009) have proposed to appreciate the micro processes of maintaining, destabilising, developing new institutions, which here lead to looking at how a single interdisciplinary master education might contribute and interact with the development of the institutions of applied science.

Terjesen and Politis (2015) takes issue with how higher education institutions handle the challenges of interdisciplinary issues. They point to contemporary societal challenges as being interdisciplinary (similar to Sauzet 2015). However Terjesen and Politis (2015) identify a mono disciplinary institution as incumbent and point to the following three institutional forces that keep this institution dominant:

1. Tenure and Promotion,
2. Journals to publish in
3. Personal identity building.

The tenure and promotion system would tend to encourage employees to stick with safe disciplinary routes in their carrier. According to Terjesen and Politis (2015) working in an interdisciplinary manner requires operating in multiple disciplines demanding very serious commitments of time and resources without certain payoffs, less visibility and legitimacy. This is enforced by the second dynamics coming from the role of scientific journals in carrier patters. Most journals are mono-disciplinary and interdisciplinary journals have lower rank (Terjesen and Politis 2015). Finally the third dynamic an individual scholar's specialization may be so fundamental to her identity that any intrusions or external challenges is taken personally. These mechanisms of keeping institutions in place can be found in all parts of the higher education system. Terjesen and Politis (2015) however especially take issues with business schools and social science Terjesen and Politis (2015) finds that the evidence indicates that this problem is particularly prevalent there. However we don't see any reason why these mechanisms would not be equally strong in for instance a health care or engineering context. Sauzet (2015) in her study of an university college in bachelor health education, finds these mechanisms and Borrego et al (2010) for example finds only limited adoption of cross disciplinary activities within engineering and only confined to single courses.

Our framework of understanding thus appreciate that establishing an interdisciplinary master education would imply institutional work of politicking, legitimizing, and solidifying the new initiative and also beyond. Ultimately certain parts of the education institutions needs to be change along with an interdisciplinary initiative.

4. The Innokick education

The University of Applied Science and Arts in Western Switzerland (HES SO) is educating a large number of bachelors (22.000+ HES-SO 2015a) in the French speaking part of Switzerland. More recently master educations has been adopted and is by now a strategic growth area for HES SO, which in 2015 confirmed an application for developing a new interdisciplinary master in integrated innovation. The master education studied has the official name "Master of Science in Integrated Innovation for product and business development" (HES-SO 2015b). It was marketed in during spring 2015 through a road show to the institutions in HES SO, a promotion video on the internet, advertising on social media and a pamphlet. It also draws on strategic partnerships that were built up with players who are active in supporting innovation, alongside a number of companies established in Switzerland. It is a full-time 90 ECTS points Master degree running over three half year semesters. The classes are delivered primarily in French, with some English. The total fee for participating is 2100 Euro. This master adopts an innovative teaching approach centred on project-based learning. It closely combined academic teaching with practical training. The

content of the master is a mixture of courses, project work, and seminars. Importantly the project work is carried out with external companies and organisations who initially give interdisciplinary groups/teams a development task. This task is then developed by the teams of student maturing the tasks into a fully described product or service concepts. This company-contact project is the spine of the master, whereas the courses are supposed to support the central process.

The main structure of the curriculum is inspired by design theory, design thinking and design management (Erichsen and Christensen 2013, Johansson-Sköldberg et al 2013, Lawson 2006) and follows a product or service innovation process:

Ideation – concept- strategy –implementation

The master is recruiting students from mainly three backgrounds Engineering, Business and Design (12, 13 and 9 students respectively, equally distributed in terms of gender). The master is officially intended to develop "interdisciplinary competences for developing innovative products and services to commercialization with success" (HES-SO 2015a, b). The main courses on the two first semesters is;

- Ideation processes,
- Product concepts,
- Marketing strategy,
- Implementation,
- Talent management,
- Innovation management,
- General culture.

The course curriculum contains 6 modules of 4 to 6 ECTS credits. Each module comprises several class units which are delivered over semesters 1 and 2. The modules are delivered centrally to all students. The practical applied project (2 modules of 12 ECTS credits) forms the cornerstone of the curriculum. Students are divided into 5 interdisciplinary groups for two semesters (S1 and S2) to develop innovative products and/or services using the tools they have acquired in the theoretical and practical classes. This project is supplemented by a reflective approach focusing on the student's personal skills. The students take part in a Summer academy, 2016, they will spend one week in Hong Kong. On the third semester a method course and a master thesis of 24 ECTS is carried out in interdisciplinary groups. The Master thesis is complemented by a class unit on research methods.

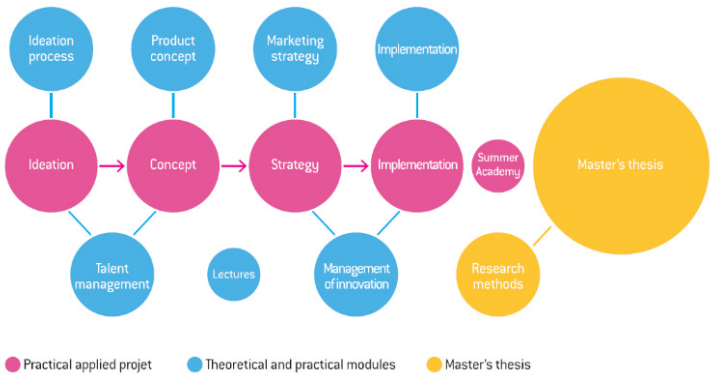

Fig. 1. The structure of Innokick. The project with enterprises follow the four core steps illustrated with purple circles

The master is given by the University of Applied Science and Arts in Western Switzerland (abbreviated HES SO). An organization established to create collaboration between University colleges in the area. The main responsible institution is the School of Business and Engineering in Vaud (HEIG VD), where the curriculum manager also is employed, also supported by the University of Art and Design (ECAL) along with teachers from other schools in HES SO. 60 people applied the first year, 36 students were selected and 2 of them dropped out after the first month. The maximum number of students allowed per year is 36 in order to assure strong support and due to the teaching approach chosen. There are 34 students on the first cycle. Many aspects of the first semester became entrepreneurial in character. The students choose the curriculum, amongst other, because of its "news" appeal. The teachers joined also to some extent for that reason. A special culture emerged also from central teachers and students being almost constantly on the same premises in a large room with a class room in one corner and an office in another with a large free space for group interaction. However finalizing the renovation of the premises extended long into the first semester. Many aspect of the operations of the education had to be done in an ad hoc manner. This manner of establishing requires a lot of energy and hours from the central persons.

5. Discussion

This education is still under construction if one appreciate the idea of an (new) education as performative. Most of the argument made here therefore need to be preliminary.

A small team of teachers created this education, established it, developed the various elements and ran the first semester. The institutional change work derives from this small group, which at a time can be viewed as a weakness and a central strength. Even if HES SO, HEIG VD, ECAL, and other university colleges have supported the initiative from initiation, it is still left to the "grunts" (Hrebiniak 2006), the "food soldiers" to realize the institutional change. They represent a small operational task force that are able to take strategic decisions on behalf of the education in a continual process.

The direction of the Master is assured by one professor – coming from the business side - who has a 40% employment rated in order to develop, establish and run the Master program. Two other professors delegated from the Design and Engineering field support the head of the Master and has a 10% part-time allocated. An assistant who works part-time (80%) helps the whole team. It should be underlined that those three professors are still fully engaged in their institutions where they conduct several tasks such as undergraduate teaching on a disciplinary base as well as research activities. One of the difficulty is the geographical

dispersion. The core persons are based on institutions that are not located in the same cities which force them to do a lot of commuting. This framing clearly provide very limited resources to establish an interdisciplinary master. Many elements needs to be created and invented on the run. The management team are forced to do extra hours and conflict that emerged put strong constraints on the management team. The management of the Master during the first year thus was really close to an entrepreneurial type of management, extremely agile, pro-active and reactive but sometimes chaotic and under very strong time pressure. These conditions surely kept the management team close to operational issues and allowed less institutional entrepreneurship in terms on impacting on the governance of the education, future resources, research issues, and maintaining and developing an industry network

As for developing an interdisciplinary education, several interpretations of interdisciplinarity is in play. Some students and teachers, see the education as a master finalization of a professional discipline grounded in the previous bachelor discipline. Other students, teachers and responsible see the education as a transformation from a mono disciplinary professionalism into a multidisciplinary. This transformation could occur through the company projects that are carried out in close collaboration between students with different educational background The different opinions and perceptions of interdisciplinarity can be seen as an enabler for a future more precise concept for the interdisciplinarity as they will add to the melting pot.

The present visions about future competences amongst teachers and students are still ambiguous. It is a sketch of possible functions, but also with emphasis on processual and relational skills. The marketing campaign in the spring did involve changing the description of the possible roles in employment and it is likely that the future development of the master will trigger more developed and precise understanding. Nevertheless this present weakness will possibly best be mitigated simply by assembling the alumni types of employment, once they emerge. It is not unusual that educations actual employment differ from the envisioned employment.

The master education is supposed to build on a research base. The master involves a number of teachers which are research active. Also a foundation of design theory is clear. However there also many indications of Applebee et al (2007) characterization of subject experts working in parallel, each bringing valuable, but fragmented elements into the education. Referring to Sauzet (2015)'s argument about an interdisciplinary practice of teachers, Innokick is a mixture between a reconstructed and disciplinary correlated team (re Applebee et al 2007). The core interdisciplinary group work together in a manner that can be described as reconstructed, blending the approaches and experiences they bring. And/but they are on the other hand "surrounded" by teachers, which tend to run their courses as subject specialists, which can be understood as Applebee et al (2007)'s concept of correlated teams, yet with relatively little team collaboration.

Innokick is an example of institutional change not only in the sense of establishing a new education but also contributing to

- A small but growing group of Master educations in HES SO, which by far is dominated by bachelor educations.
- Growth of HES-SO and of HEIG VD
- Collaboration across educational institutions
- Development of a research based master curricula in a Bachelor based educational institution context

Such change appear at present only to be possible with a fiery soul entrepreneurship approach, where single educations are necessary steps in the development, yet the potential institutional change go far beyond the single education. It is at present difficult to evaluate the impact on the institutions, but it could lead to a gradual shift in weight from local canton based higher education to more region based, i.e. common for the entire French speaking West Switzerland. On the other hand we interprete it as possible that HES SO will continue to operate a large number of monodisciplinary bachelor educations and that also future new monodisciplinary masters might be launched. Interdisciplinarity might be a sub institutions, that is accepted and stable but won't develop into dominant. A coexistence of several institutions is seen also in other institutional theory contributions (Gestel and Hildebrand 2013) The barriers for such institutional change go beyond the education sector context and relate to cantonal, regional and national development, where education institutions are a piece among many. It can be noted that a bottom up basis for establishing a new education is probably a recurrent approach in many educational institutions. In other words institutional change occur in a bottom up manner.

It is our particular contribution to analyze the interrelation between establishing an education and the changed institutional framing, especially with a view to the tension between the dominant mono-disciplinary set up of HES-SO compared to the interdisciplinary master education in question. A tension which is put in perspective by the bottom up approach the education was realized through.

6. Conclusion

The objective of this paper was to study how an interdisciplinary master education can become embedded in an otherwise disciplinary oriented environment and how the embedding can trigger institutional change to support it. The Innokick education is proposed understood as interdisciplinary, and involving reform of the underlying institutional structure. We used educational research to establish an understanding of interdisciplinary curricula as a continuum of types from very loose, transactional, to very close and transformational. Also institutional theory on change was adopted to study the dynamics around establishing an education. The Innokick education is still very much in a melting pot where many aspect can develop and transform. Some barriers have been found here however, and it seems that for example, the research base of the education is a profound barrier for future development. Also the special entrepreneurial spirit that has characterised the first semester could easily wear away, leaving both students and teachers with a more "sober" way of working, where additional personal energy is not always there as resource. For strategy makers in educational institutions, which want innovation in education, it is worth a thought, whether the present entrepreneurial, fiery soul based approach is strong enough to develop innovation or whether a new more integrated approached with more thorough resource support is needed to assure sufficiently swift response to labour market threats and opportunities.

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