Programme Review of MSc in Digital Innovation and Management (DIM) at the IT University of Copenhagen 2016

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Introduction

The DIM programme is new and is based on the synthesis of societal, organizational, and technical concerns. The programme has been successful in attracting many good applicants. It has also been good at securing a high completion rate. There has been a high employment rate of students completing the previous programme taught with CBS. There are indications that this also may be the case for the DIM programme, but it is still too early to tell. So, in summary, the course seems to do well both in terms of recruitment, teaching, and employment of finished candidates. The evaluation committee spent two days visiting ITU, where we met a broad cross-section of students, lecturers and managers. Everyone was extremely helpful and our impression of the degree programme was overwhelmingly positive. The aim of the committee's work has, therefore, been to assess the programme in order to offer advice on further improvements, for example, by highlighting themes for further discussions amongst management, staff, and students. As the programme is only a few years old, and by design is sought to differentiate itself significantly from the previous programme, the committee view this evaluation as an opportunity to not only celebrate its successes, but also to take stock of what can be further improved.

In summary, the committee is generally satisfied that the degree forms a valuable addition to ITU's suite of programmes, and our recommendations can be summarized as following:

1. Be more clear on what the education covers – especially for the students coming from outside Denmark.
2. Ensure that the appropriate level of prerequisite level of skills expected are met before students are enrolled within the programme. This is in particular concerning information technology (IT) skills expected.
3. Instantiate better cooperation across the participating disciplines teaching on the programme through a structured and facilitated approach. This will strengthen the core of the education and help the students better and more easily to understand the interdisciplinarity, which is the unique value proposition of this program.
4. Consider closer cooperation with institutions and companies on specific projects. Facilitated cooperation with external parties who can deliver data for projects and courses would strengthen the students' experience of working with real-life examples that are useful to society.
5. As ITU is a young university and as DIM is a new education, it is critically important that the institution is clear on what the graduates bring to the market after completed education
6. Establish a robust internal discussion to ascertain to what extent the degree programme can benefit from including more advanced technical elements sourced from other departments within ITU.

Positioning and Communicating DIM

One of the key themes the committee's discussions with management, staff, and students highlighted was the positioning of the degree programme and the communication of this internally within ITU and externally. The DIM program aspires to offer a unique value proposition in the Danish/European educational market. Two focal points of concern arose from the panel interviews: 1) is the unique value proposition of the DIM well-formulated, communicated and understood by all of the internal and external stakeholders of the program?; and 2) does the design of the DIM optimally facilitate the realization of this value proposition?

Internal

In our discussions with students, it was clear that most students were satisfied with the programme and generally found that it lived up to their expectations (and indeed at times superseded these). The student satisfaction survey scores generally show a high level of satisfaction with faculty, but generally lesser satisfaction with the courses. This could indicate that further improvements can be made in the management and organisation of the learning process, of individual course, and how these are experienced as a portfolio making up the degree programme.

We did also speak with a minority of students who expressed dissatisfaction with the programme. Their main gripe was the mismatch between what they had perceived as the main thrust of the programme, and what they had experienced when engaging with it. This dissatisfaction mainly centred on the opportunity to engage in, and select options for, courses that would expose students to specific project management tools and technical skills. These students expressed a dissatisfaction with the balance between such technical skills-based courses and those emphasising broader ability to engage critical discussions.

As the committee sees this problem, it consists of two separate but interrelated issues, which ITU will need to work further on. Firstly, a cleared definition and communication of the programme profile, and secondly, an internal discussion of the relative weighting of the constitutive elements of the programme. Both are touched upon further in the remainder of this report.

External

The unique proposition of the DIM programme is that it exposes its students to a collection of theories and techniques supporting their journey into complex interrelationships between technology, individuals, organisations, and society. ITU must be able to clearly articulate how this unique portfolio of elements can contribute

to society in general, and the students and their prospective employers in particular. As the DIM programme is a relatively new replacement for the previous programme taught with CBS, it is still too early to make firm statements on how well candidates are integrating into the labour market. Early indications, however, are that the programme enjoys a respectable level of success in terms of recruitment/placement. This suggests that the education is valued by employers and speaks to the needs of the marketplace. This is supported by the feedback from the external employer panel (Aftagerpanel) associated with the graduate program.

That being said, there is some evidence to suggest that a more cohesive external narrative would be helpful in demarcating the programme's unique value proposition when compared with ITU's other programmes, as well as competitors such as CBS. Evidence suggests that the lack of consensus on the DIM's positioning was challenging for potential recruiters, as well as setting inaccurate expectations for potential students. The programme can, therefore, do better in shaping these expectations. The programme website indeed has a good precise one-line characterisation of the course – although the programme seems to weigh analyses beyond the organisational level higher than this description emphasises:

"In the MSc programme in Digital Innovation & Management you will be equipped with knowledge, skills and tools for understanding and managing complex and often turbulent processes of digital change and innovation in a wide variety of organisations."

Additional effort can be invested in establishing a collective understanding of how best to represents the programme's unique interdisciplinary proposition in a concise text. This process can greatly support the internal discussion of the programme profile and of how best to integrate the various constitutive fields of study. For example, if the specialization in Big Data is not intended to provide a broad range of skills related to the technical arrangements, then make a point out of explaining up front the advantages of having different perspectives. It should also be clear for the prospective applicants: 1) that the degree programme is almost entirely based on qualitative methods; 2) that social science theories will feature significantly; and 3) what kinds of technical skills the programme will foster, and at what level.

As ITU from an external observer may be perceived as an exclusively technical institution, it is critical to manage the possible dissonance emerging from students perceiving the DIM programme as comprised of significant technical content, and then subsequently being subjected to what in essence is a social sciences degree integrating elements from business studies, information systems, and computer science.

Structure of the DIM programme

Distribution and Weighting of Elements

The DIM programme seeks to imbue the students with the ability to engage critically in complex socio-technical situations, and thereby contribute to both understanding and design. The programme pursue this aim by incorporating balanced concerns within three main pillars; 1) A comprehensive understanding of socio-technical issues from a broad societal perspective; 2) an understanding of the design of contemporary business arrangements; and 3) understanding of contemporary digital technologies and their role in designing of societal and business arrangements.

Achieving such balance is very difficult at the best of times, also because two individuals may indeed not agree what constitutes a proper mix, combination and balance. The faculty managing and teaching the DIM degree programme mostly have a strong social sciences background, some based within Science and Technology Studies (STS), and others within Information Systems (IS). While there is some overlap between STS and IS research, the former tends to have a broader societal perspective, and the latter predominantly operate within an organizational context. The computer science element is very much the prime concern for most of the rest of ITU. As good social science theories and techniques can assist students in opening their minds to different ways of understanding and engaging, solid technical skills can greatly help understanding how to both unpack and build technical black boxes. Put in simple terms, the former seeks the understanding by analyzing how relations create emerging complexities, the latter through separating the constitutive elements and inspecting their specific interrelationships. The strength of DIM should be to find its own balance in order to facilitate the students' individual journeys navigating these concerns.

As the DIM programme is relatively new, and as it departs radically from its predecessor taught with CBS, we found a vivid internal discussion among the students of both how to balance these different concerns, but in particular also on how to establish synergy between these. The student body forms the key integral element as they engage with the different modules taught and populate a discussion across different concerns. There seems, however, to be many good reasons for further integration at the level of programme management and individual lecturers. By 'further integration' we do not necessarily recommend consensus or full scale compatibility. A productive further integration may also consist in a frank recognition of differences and clearer communication to the students about how different perspectives in the programme may complement or challenge each other.

The discussions with staff and students indicated several ideas for further integration, such as the increasing use of cases, topics and materials across different modules. Another possible idea may be to make the teachers on each semester jointly responsible for producing an introduction to the semester, focusing on the coherences and complementarities between the modules. The students raised this issue several times, for example, in the challenges of integrating the different perspectives without similar material being repeated across different modules. Detailed systematic discussions are necessary in order to design better potential for synthesis into the programme. In addition, such discussion of the programme structure and the possibilities of integrating perspectives within it could also touch upon the extent to which the programme with its current three areas of specialization can produce the diversity of students matching the external need for skills and abilities. Such discussion will of course be more strategic than operational as it may result in aspirations for future areas of specialization. In addition, some of the students pointed out that there in reality only were two areas of specialization although three are listed: Digitalization and Business Model Design; Big Data; and Identity in a Digital Society.

Science and Technology Studies (STS)

The DIM programme is centred around the aim to provide students with distinct abilities to think critically on complex digital innovation arrangements with respect to societal impact, business model design, individual consequences, etc. As a natural consequence of this, STS courses, in particular the Navigating Complexity course, play a key role in forming professional identity of the students and in challenging them to embrace different perspectives. The Navigating Complexity course (and its spin-off activities in the Ethos lab) is a resource to build on and foundation from which further integration between the programme modules should be pursued. Some comments suggested that the capacity of critical reflection was segregated to the STS portion of the classes. A greater thematic integration across courses would help students naturally apply critical thinking in more normative classes. In addition, some of the students expressed a desire for stronger writing skills. This need has recently been addressed through a new elective writing course. The continuation of this course and/or similar efforts are highly recommended.

The programme has declared itself based on qualitative methods, which is highly acceptable. This can, however, prove somewhat challenging when one of the specialisations is on big data approaches, which rely on the mixture of qualitative reasoning and a variety of quantitative approaches to identifying patterns. This issue relate more fundamentally to the discussion of how to create a productive mix of (a) qualitative analytical skills and of critical ability to contextualise and question and (b) technical insights and skills, for example, in coding, in database design, or in creating big data functionality through configuring statistical techniques. Whilst the

former may in the long run be the most durable and the core of the programme, the latter forms an important technical foundation from which the students can gain the ability to develop qualitative and critical thinking. As argued by Dahlbom & Mathiassen (1993)[1], the IT professional is precisely one matching technical engineering skills with broader more critical concerns.

Information Technology and Computer Science

The DIM programme integrates well a range of technical concerns understood in a broader societal or organisational context. This is in essence the identity of the programme. The question of the relative weighting of information technology skills vs the ability to critically understand a variety of information technologies embedded within contexts is an issue for continued debate within ITU.

The committee also engaged in intense discussions of the role of the information technology/computer science elements in the DIM programme. Several students expressed a desire to be exposed to more IT skills as part of the curriculum. They feel that a better understanding of how to use different tools will help them in their project work and also provide them with an asset for the future employment outside of ITU. The ITU staff express varying opinions ranging from any technical skills being required before acceptance to the programme to the definitive need for more elements to be included by sourcing it from other departments within ITU. The student body also expressed diverse opinions ranging from general satisfaction with the current programme (but not directly pushing back against further technical content), to very strong opinions from a couple of students dissatisfied with this particular aspect.

We suggest a further internal discussion of the provision of teaching in more in-depth technical themes, with a view to align the internal understanding of how the fundamental pillars of the course should be integrated/balanced. This could, for example, result in extending the provision of technical skills and build on the basic requirements of technical skills sought required for entrance into the programme, for example as coding and database design skills. The emphasis on mastering tools for data analysis is absolutely fine, but building on further coding skills could indeed be most helpful for the students in their later work – for example by providing the practical insights in the complexities of coding.

Organisations, Business, and Entrepreneurship

While much of the DIM identity is shaped by a social science approach, the introduction to the programme on the ITU website emphasises the specific

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[1] Dahlbom, B. & L. Mathiassen (1993): Computers in Context — The Philosophy and Practice of Systems Design. Cambridge, Massachusetts: Blackwell Publishers.

challenges of digitalisation within an organisational context. The aspects of business model design, entrepreneurship and the general challenges for organisations are all issues explored in several modules within the programme. However, the students suggested that the curriculum was somewhat weak in this area, and that some experience a tension between the critical thinking represented by the STS classes, and the more normative classes in Business and IT. The three elements are equally weighted in terms of ECTS points in the education. There is no reason to believe that the perceived differences or even tensions between normative and descriptive/critical knowledge traditions can or should be resolved. However, since the defining feature of the programme is to bring these difference together in a productive manner, efforts should be made to create closer connections between the perspectives (e.g. by shared cases). Two conclusions emerged from this conversation: 1) it might be worthwhile to consider a increased weighting of the business and ICT classes; 2) course design should attempt to desegregate the reflection/critical thinking aspects and integrate them as a natural part of the normative/constructive topics.

Student Life

ITU is fortunate to enjoy engaged and highly competent facility, which the students very much appreciate. The students are physically present at the campus and the ambience is lively and exciting. While the student surveys highlighted issues related to the integration of non-ITU students, then our conversations with students did not further add to what has already been discussed in the internal ITU report on DIM.

Labs/Non ECT Activities

ITU boasts a number of Labs, which the students participate in for non ECT activities. Interviews with the students suggest that the labs are very much appreciated; they serve as mechanisms for socialization and integration with PhD students and faculty. A clear message was that the role of the labs could in fact be expanded, possibly to some ECT based coursework. There is a great interest from the students to engage closer with faculty research. The students suggest that the junior researchers in the lab could help conducting ground work that is part of the research of the faculty thus creating a stronger sense of doing real research. The junior researchers also express a strong interest in working with external organisations and delivering collaborative research based on data sourced from these organisations. The junior researchers clearly want to move from theoretical work based on examples created for the purpose of teaching to working with real-life examples and data. It is the committee's understanding that such efforts indeed already are underway as part of two incoming research projects.

Group work

Almost all courses include some kind of group work. While the students in general are very satisfied with this mode of working, they do highlight the ability to better coordinate group work including the possibility of consolidating the number of groups they are part of at any point in time. Most students have a student job outside of ITU in addition to their studies and having several working groups to coordinate is a logistical challenge. One of the students highlighted her participation in a large number of different groups, and the problems of coordinating meetings and deliverables across these. There seems here to be a risk of attainment suffering if the coordination efforts of engaging in a large number of groups becomes highly time consuming. A suggestion to solve this problem is to create study groups that cover several courses so that each student is member of fewer groups. While this may not be immediately achievable for logistical reasons, programme management may find it useful to consider the balance of individual and group work in general, and in particular, how to consolidate groups across courses.

Coordination Across Disciplines

Faculty engagement
Interviews with DIM faculty indicate that a common understanding of what the programme aspires to do is lacking with some faculty. This effect is felt in several levels. The first level is a general lack of coordination between faculty designing individual classes. The problems here are frequent in many educational institutions: redundancies, missed opportunities for synergies, and undesirable knowledge gaps. A second level, which may be of greater concern, is that some faculty actually expressed some disdain for what other faculty are doing in the programme. One faculty actually mentioned the need for the students to "unlearn" content of the other classes. While these type of tensions can play an important function in helping students developing a sense of critical thinking and scientific debate, it should be purposefully orchestrated and conscious, and not the result of a lack of coordination or mutual respect. It is essential for the future success of the DIM programme that these issues are addressed in a balanced manner as all three core-elements of social science, business studies, and digital technology are essential for the profile of the programme.

Course Design
One of the first and most important classes is Navigating Complexities that students are required to take when entering the DIM programme. Overall, the students find this class to be positively unorthodox and challenging. This class also defines the tenor and culture of the programme to a large extent; social contracts with the students are formed, and one can say that the heart and soul of the programme is

well-represented in this experience. However, after the completion of Navigating Complexity, the students expressed a certain dissolution of this unique way of thinking and problem solving as the programme progressed into a series of individual classes across disparate disciplines. One result is that the students expressed a stronger emotional connection with one discipline vs. another, which, while predictable, contradicts the intent of the program's unique value proposition.

There are variety of ways one can address this. At one level, increased coordination across classes and disciplines can help cultivate a consistent logic and narrative across both related and diverse subject matter. This could be achieved by using the same case/examples across several classes but with different angles/viewpoints or by letting the students work on the same projects in several classes with a different focus. At a higher level, one can consider additional classes or exercises of a similar genre to Managing Complexity that surface cross-disciplinary synergies – the magic of the programme. For example, one might consider modules of "Managing Complexity I, II, & III", distributed at the beginning, middle and end of programme. Alternative strategies include trying to design similar exercises within extant classes, etc. The purpose would be to iterate with greater frequency the special learning effects of this kind of exercise with regularity in the program, not just the beginning.

Pedagogical Methods
There appear to be a variety of pedagogical methods used across the programs. To a large extent, this seems to be at the discretion of the individual faculty. Given the unique educational aims of DIM, some top-down design of pedagogical methods might be valuable to reinforce the educational motive of the program.

Admission Requirements

Managing heterogeneity

IT Skills
A large degree of heterogeneity in the students IT backgrounds was evident. Some students arrived with substantial industry experience and fully expected a higher level "hard tech skills" education (systems development, IS project management), while others have very little practical IT experience. Where DIM does provide an IT fundamentals core curricula, there was clear evidence that the IT skills component could be increased substantially with little additional cost for the ITU or the student's time. Here, we suggest that ITU considers the inclusion of compulsory technical elements, for example on; database design, principles of programming, and systems architectures. There are a variety of modalities to address this: skills upgrade classes before the program begins, online resources, boot camps, as well as

traditional courses held within the context of DIM. Overall, developing a more homogeneous tech/skills background will be beneficial to the DIM core identity, student cohesion, as well as recruitment and employment potential.

Cultural

The cultural diversity of the programme is substantial. This seems to be valued and embraced as a constructive element in the learning experience. Students from different cultural backgrounds arrive with different educational norms, and these expectations should be explicitly managed. The international environment is seen as a great strength by the students. While the internal ITU report mentions some problems related to the integration of the students, the committee did not get significant feedback on this from students or faculty during our visit.

Professional

Substantial disparity in professional backgrounds is prevalent in the student body. This is not necessarily negative; it can in fact be leveraged towards positive learning outcomes in team-based exercises. However, it does present certain challenges in terms of management of the students' expectations and educational aims. The course design should acknowledge this heterogeneity in in student backgrounds and seek to maximise its value as a source of learning, while mitigating any undesirable effects in terms of distorting pedagogies or learning outcomes. If the diversity is not already used as a resource when forming groups, it may be so in the future.

Educational

As the requirements for admission are broad, students come with a variety of educational backgrounds including profession bachelors such as nurses and graphical designers. This is seen as a clear challenge by the teachers who need to teach critical thinking on a much more basic level to students with a non-academic background. There is already a plan to be more clear on admission requirements as well as a limitation to what kind of bachelor is required.