**Minutes of the National Informatics Associations (NIAs) Workshop
on "Interdisciplinarity and Informatics"
28 October – 09:00-12:30 (CET)
Online via Zoom, ECSS 2020**

Wednesday, 28 October 2020

Workshop Schedule

09:00 – 09:10   **Welcome and Introduction**

09:10 – 09:50   **Session 1 - Research**
Chair: Gerald Steinhardt, *Informatik Austria*

09:50 – 10:30   **Session 2 - Education**
Chair: Bart Demoen, *i22n - Forum voor Informaticawetenschappen*

10:30 – 10:40   *Coffee break*

10:40 – 11:20   **Session 3 - Large-scale Trends**
Chair: Paolo Atzeni, *GII - Gruppo Ingegneria Informatica*

11:20 – 12:00   **Session 4 - Societal Aspects**
Chair: Martin Glinz, *SIRA - Swiss Informatics Research Association*

12:00 – 12:30   **Conclusions and the Way Ahead**

09:00 – 09:10 Welcome and Introduction
Enrico Nardelli, President of Informatics Europe (IE), welcomed the participants and opened the meeting. The meeting aimed to discuss the increasing emphasis on interdisciplinarity in science, which raises nontrivial questions for Informatics in at least the four dimensions of research, teaching, large-scale trends and societal aspects.
Pekka Orponen, member of the Board of IE and responsible for the relations with academic associations, presented the agenda and welcomed the four Session Chairs of the workshop. The Chairs had been requested to challenge the audience on selected focus questions in the respective four dimensions connected to the theme "Interdisciplinarity and Informatics".
The workshop slides and video recordings are now accessible on the [workshop's website](#).

09:10 – 09:50 Session 1 - Research
The session on Research was led by Gerald Steinhardt, Chairman of *Informatik Austria*, and started from the candid thesis that interdisciplinary research is largely wished-for but is in fact widely not esteemed and not sufficiently supported, particularly when assessed by disciplinary criteria. Some exaggerations of community views that he confronted the audience with were that the call for interdisciplinary research is largely 'theoretical', exhibits a lack of strategic planning and that interdisciplinary research has little or no funding. In addition, he pointed to the following community concerns pertaining to interdisciplinary work:
- Forming of "predatory alliances" (to secure funding without substantial interdisciplinary cooperation)
- Informatics as an ancillary discipline (= interdisciplinary collaboration with little or no impact on the scientific progress in Informatics)

- Proposals of lower quality could be accepted (because of the "hype" about interdisciplinary research)
- A significant increase of interdisciplinary research in Informatics could weaken Informatics as a scientific discipline.

The first focus question raised was "How should interdisciplinary research be carried out so that Informatics benefits most from it and does not serve only as an ancillary discipline?" Or to put it in different words: "Does a significant increase of interdisciplinary research in Informatics weaken Informatics as a scientific discipline?" The discussion participants brought up three partially complementary views to this question: (i) emphasizing to the other sciences the difference of Informatics as a discipline and as a methods toolkit (Informatics as science vs. Informatics as engineering); (ii) the value of bringing improved methods and tools, based on Informatics as science, to other areas; (iii) bringing Informatics as a science to the core of interdisciplinary collaborations. Introducing high-quality Informatics tools and methodology to other disciplines, such as the proper use of ML/AI techniques, or proper systems design methodology, would help other disciplines appreciate the contributions, and the Informatics community would benefit from the collaboration at the same time. It was also noted that in deep interdisciplinary collaboration, one should learn to embrace the other fields as well as a broader view of Informatics in general.

The second focus question during this session asked for the structures and actions that are best suited for advancing interdisciplinarity in Informatics research. Several participants shared concrete best practices examples and in the discussion a diversity of approaches emerged. Some countries and universities had implemented top-down cross-faculty centres, others were supporting the bottom-up development of small teams or other light-weight collaboration models (e.g. small projects, shared doctoral students/postdocs). Important general questions that arose were who funds and "owns" the instruments (e.g. who sets the research agenda), as well as how and by whom are they. It was emphasized that the evaluators of such practices should have experience in interdisciplinary collaboration themselves. Some participants also reported that their universities have no interdisciplinary departments at the moment and that it is sometimes difficult to find supervision for starting such initiatives.

09:50 – 10:30 Session 2 - Education
The session on Education was led by Bart Demoen as the representative of *i22n - Forum voor Informaticawetenschappen*, Belgium. He raised the following three focus questions:

Question 1:
Interdisciplinary teaching is not a goal in itself, it must serve a goal worth pursuing or solve a (possibly general) problem. What are the worthy goals of including Informatics in interdisciplinary teaching? What problems does it solve?

Here the participants emphasized the point of view of Informatics as a fundamental methodology or even a "language of science". The notion of Donald Knuth of Informatics as a complement to Mathematics was brought up: both Mathematics and Informatics are ways to precisely express and discuss quantitative issues, but answers in Mathematics are formulas, answers in Informatics are processes. Also, the increasing need for complex modelling, to be addressed with Informatics techniques (in combination with Mathematics and Physics), were raised.

Question 2:
Which topics of Informatics should be included in an interdisciplinary curriculum (e.g. Bioinformatics)? Should these topics be taught by and from the point of view of a computer scientist, or rather as independent interdisciplinary topics? Concerning Informatics, is it a matter of depth versus breadth?

Here the focus of the discussion was if it would indeed be possible to identify a core Informatics curriculum for interdisciplinary programmes, e.g., not separate "Informatics in X" curricula, but a single Informatics Core curriculum. As a word of warning, it was noted, however, that each discipline has its own needs, and Informatics should not be pushing its disciplinary topics on others.

Question 3:
What are best practices for interdisciplinary teaching including Informatics? Is it by team teaching, does it involve mainly problem-based or project-based didactics? What are the showcases showing a substantial benefit of Informatics in interdisciplinary teaching?

Here two complementary approaches were raised: emphasizing the fundamental concepts of Informatics from the beginning vs. starting from the concerns of specific disciplines and building from there towards concepts and methods in Informatics that could help in addressing them. Support was given to both approaches. Nevertheless, it was concluded that the eventual goal should not be to teach specific Informatics tools to the disciplines, but rather how to think about the disciplinary problems in Informatics terms.

The organisational challenge of universities being structured in Schools or Faculties was raised. In one example case, an ambitious cross-school programme in Environmental Sciences had resulted in not much more than a collection of courses in Chemistry, Biology etc. from the respective Schools.

Another perspective on the nature of Informatics was provided by the suggestion that science, in general, is about (1) building predictive models and (2) confronting them with reality. For simple sciences such as Newtonian Physics, Mathematics is good enough, but for more complex sciences, such as e.g., Biology or Social Sciences, Informatics is needed. So, it should become a core methodology to be taught, similarly, as Mathematics has been since the 19th and 20th centuries. (To this, one of the participants commented that the Informatics community may not yet be fully up to the task, because much of current Informatics research focuses on task (1) and disregards task (2).)

10:30 – 10:40 Coffee break

10:40 – 11:20 Session 3 - Large-scale Trends
The third session, addressing Large-Scale Trends, was chaired by Paolo Atzeni, President of *GII - Gruppo Ingegneria Informatica*, Italy.

To his first question, whether there is a need for interdisciplinary people or multidisciplinary teams, some participants suggested that it would be easier to start with multidisciplinary teams, whereas others would put more weight on a cross-disciplinary approach of transferring knowledge to specific application domains at the level of research methods. Better communication of research questions to an interdisciplinary audience was identified as an important goal for the Informatics community in general.

The discussion then continued with the question of how to educate people to participate in multidisciplinary teams; whether there is a need for interdisciplinary degree specialisations or is it enough for Informatics graduates to have an attitude of listening. A proposal was put forth of developing study paths with a BSc in Informatics and an MSc in a different specialization. In this view, interdisciplinarity could be seen as a transversal "pillar" with "vertical" pillars in various disciplines. This was countered with the observation that unfortunately in Europe degree structures are often so constrained that genuinely interdisciplinary degrees are difficult to create. An alternative approach could be the introduction of double degrees; however, one must also be attentive to the needs of the job market when creating new degree programmes.

Other participants emphasized more the need of being able to speak to other areas, rather than becoming a disciplinary expert in them. A good instrument in this would be a strong minor in an MSc degree if such an arrangement would be possible in a given degree structure. The session Chair agreed to this and stated: "Indeed the most important competence is to listen and speak to other disciplines. We need to convince the students that they need to learn about the application domains before developing for them. Some kind of 'clinical experience' would also be useful here." (Referring to an earlier discussion of including industrial or cross-disciplinary internships as part of Informatics studies.)

11:20 – 12:00 Session 4 - Societal Aspects
The final session on Societal Aspects was chaired by Martin Glinz, President of SIRA - Swiss Informatics Research Association.

The first question raised focused on the role of Informatics in a digital society and the way in which universities could contribute to this. Thereby, it was discussed if Informatics should be a driver of change, an enabler of change or just an auxiliary discipline with other disciplines in the driver's seat. Participants of the workshop elaborated their experiences and commented that if one restricts Informatics to technical aspects, then it cannot always be the main driver, but if Informatics is interpreted in a broader frame, also including the human aspect as well as economics, the environment and limited resources, then the field can have a leading role. Other participants complemented this by emphasizing that since Informatics will be a new backbone of all sciences, it will have a more prominent role, and universities should educate students to understand and take advantage of this. Starting by explaining that analytical solutions are not enough and that for any problem with high complexity, a software solution is needed. Universities should then teach people to build the computational models for their own discipline, possibly by introducing some kind of "meta-course" on the methodology.

One example was presented from Chalmers University of Technology, Sweden, which supports small multidisciplinary projects across the campus with so-called Areas of Advance (AoA) that are multidisciplinary and focus on collaboration with external stakeholders - industry, healthcare and local institutions of government. The ICT AoA is thereby both a driver and an enabler of changes contributing to many applied fields, especially AI applications but also digitalisation in general.

The second question asked how Informatics is contributing to today's societal grand challenges. Here an initial argument was made that Informatics both creates an increasingly complex society, and also provides solutions for increasingly complex problems: challenges will arise though if digitalisation is pursued without keeping a view of the broader goals. One example of addressing this trend was presented from University of Paderborn, Germany, where a research theme WORK 4.0 tries to envision the future of working situations and Informatics support for them, developing e.g. adaptive

assistance systems for crowd-based working models. The human is always put in the centre. In a related development, the University of Zurich in Switzerland has introduced a mandatory course on "People-oriented Computing" in their BSc in Informatics curriculum. Furthermore, the University of Zurich has launched a university-wide Digital Society Initiative which brings together researchers from all disciplines.

In another direction, it was recommended that advancing and implementing an interdisciplinary Informatics field of "Environmental Informatics" could be a topic in Informatics departments. It was also suggested that Informatics should contribute to interdisciplinary research on the rise of social networks, fake news etc., in collaboration with e.g. sociologists. A very broad question related to these developments is who actual owns the means of production in the digital society. On this issue, Enrico Nardelli, President of Informatics Europe commented: "It was 'the capital' in the industrial society, it is not necessarily so in the digital society. There might now be an opportunity to 'bring the power back to the worker'. Of course, there needs to be infrastructure, networking etc., but societies are providing this. Even though the inequality gap currently has been widening rather than narrowing, the opportunity is there." Paolo Atzeni added that "If Informatics as a cultural element is spread more widely, this removes the magic from the technology and empowers people. At a meeting with Constitutional Law professors in Italy, the law professors were impressed to learn about the notion of an algorithm. This reinforces the idea that Informatics should be a part of the cultural background of every citizen. Not the new backbone, but part of the commonly shared background." In the brief discussion that followed towards the end of the session, it was again emphasized that the human aspect is missing in many recent technological initiatives for the digital transformation, and if we do not care about humans, this transformation will not be successful.

12:00 – 12:30 Conclusions and the Way Ahead
In the concluding session of the meeting, the Session Chairs were first asked to identify their main impressions from the discussions, followed by further participant comments. Some of the key observations were:
- Need to explicate and communicate the message of Informatics as a science rather than technology and develop partnerships on this basis.
- Identify core elements in the Informatics curriculum for interdisciplinary collaboration. This might take the form of a common "standard" Informatics Core curriculum or tailored models for collaborations with more limited needs.
- Communication is essential for real successful interdisciplinary collaboration; disciplines should listen and learn from each other.
- We should nevertheless not forget our role as engineers and technology providers too. In addition to our disciplinary and interdisciplinary research and teaching, this is an important way to contribute to the development of science and the good of society.

It was agreed to form a small planning team consisting of the Session Chairs and members of the Informatics Europe Board to discuss further preparations for (a) brief position papers on topics where a reasonable consensus seemed to emerge from the meeting, (b) a follow-up workshop(s) on significant topic(s) where further discussion could lead to concrete and useful outcomes.