

Report Ethical/Social Impact of Informatics as a Study Subject

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On behalf of the Working Group

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WORKING GROUP OF INFORMATICS EUROPE ON: Ethical/social Impact of Informatics as a Study Subject in Informatics University Degree Programs

- The social and ethical impact of new technologies is a key issue of our increasingly connected society that affects users, developers, researchers and governments.
- During their training in university degree programs in Informatics, students are provided with the basis for designing modern computer systems.
- **Should students be trained also on ethical and societal topics, thus enabling them to conceive “good” and beneficial Informatics systems for the society?**
- In February 2019 a group of experts, 32 till now, following an open call for interest was convened in the WG, with the goal of:
 - Analyze this issue;
 - Understand the current state of affairs;
 - Solicit a discussion on these topics;
 - (May be) define a sort of guidelines for designing suitable courses on these topics.

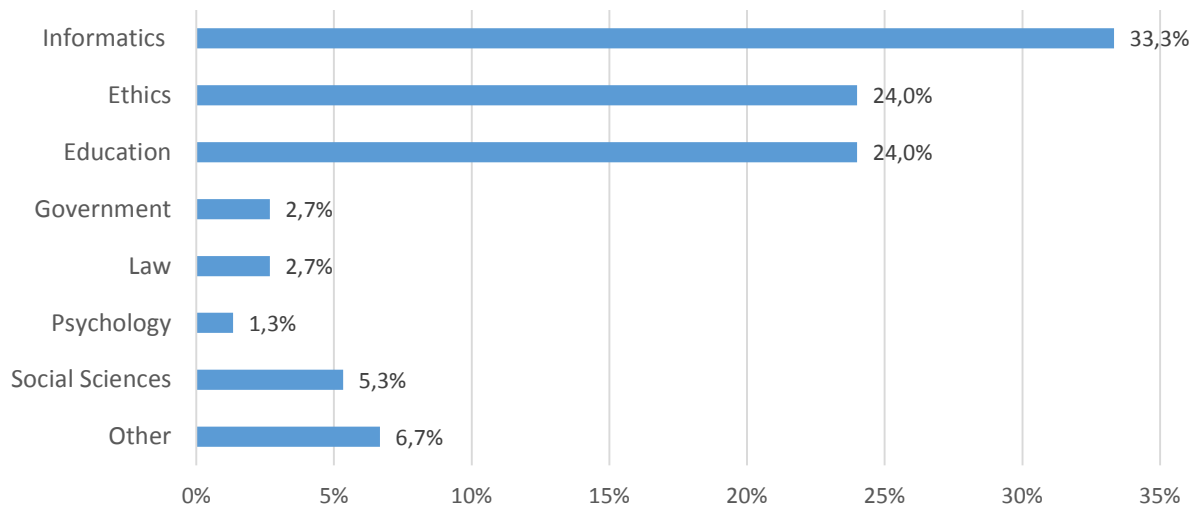
REPORT of the WORKING GROUP

- The topic is very broad.
- In this first exploratory phase, we defined a questionnaire (30 WG members replied).
 - <https://www.informatics-europe.org/survey/index.php/919985/lang-en>
- Report collects and summarizes the results of this consultation and is a starting point for further discussions and to establish how to focus WG further work.
- You can consult it in the web page of the WG:
 - <https://www.informatics-europe.org/working-groups/ethics.html>
- I present only some points (possibly subjects of further investigations) emerged from this consultation.

WG members: Area of Expertise

- Several members of the WG have proven experiences in the development, implementation, and monitoring of courses about Ethics and social impact in the different level degree programs of the ICT area.
- Some of them have a highly interdisciplinary profile covering both Computer Science & Engineering, and Philosophy.
- Almost all respondents pointed out the risks and perspectives of the implementation of the newest applications of informatics.

WG members: Area of expertise



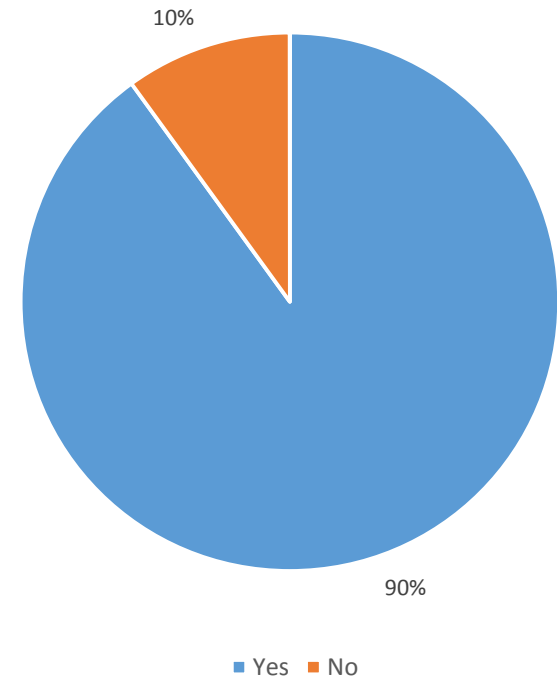
Some questions:

1. Should the ethical/social impact of Informatics be a study subject in Informatics university degree programs?
2. In which areas ethical/social impact of Informatics is more evident?
3. Which are the topics of study that should be taught at university courses in order to make students skilled in ethically aligned design?
4. In which way and when the ethical/social impact of Informatics should be a subject of study?
5. Who should teach in these courses/modules?
6. etc....
7. Often there is also the question "why?" to comment many of the given answers in free text.

“Should the ethical/social impact of Informatics be a study subject in Informatics university degree programs?”

B3. Should the ethical/social impact of Informatics be a study subject in Informatics university degree programs?

- For the most part, the answers were positive obvious due both to the specific skills of the respondents and their interest in participating in the WG.
- Motivations are well articulated and consistent.
- Negative responses: Ethical/social impact of Informatics is not yet considered a clear intellectual discipline, and therefore it should be incorporated into several technical subjects, so that students perceive them as a part of their discipline.

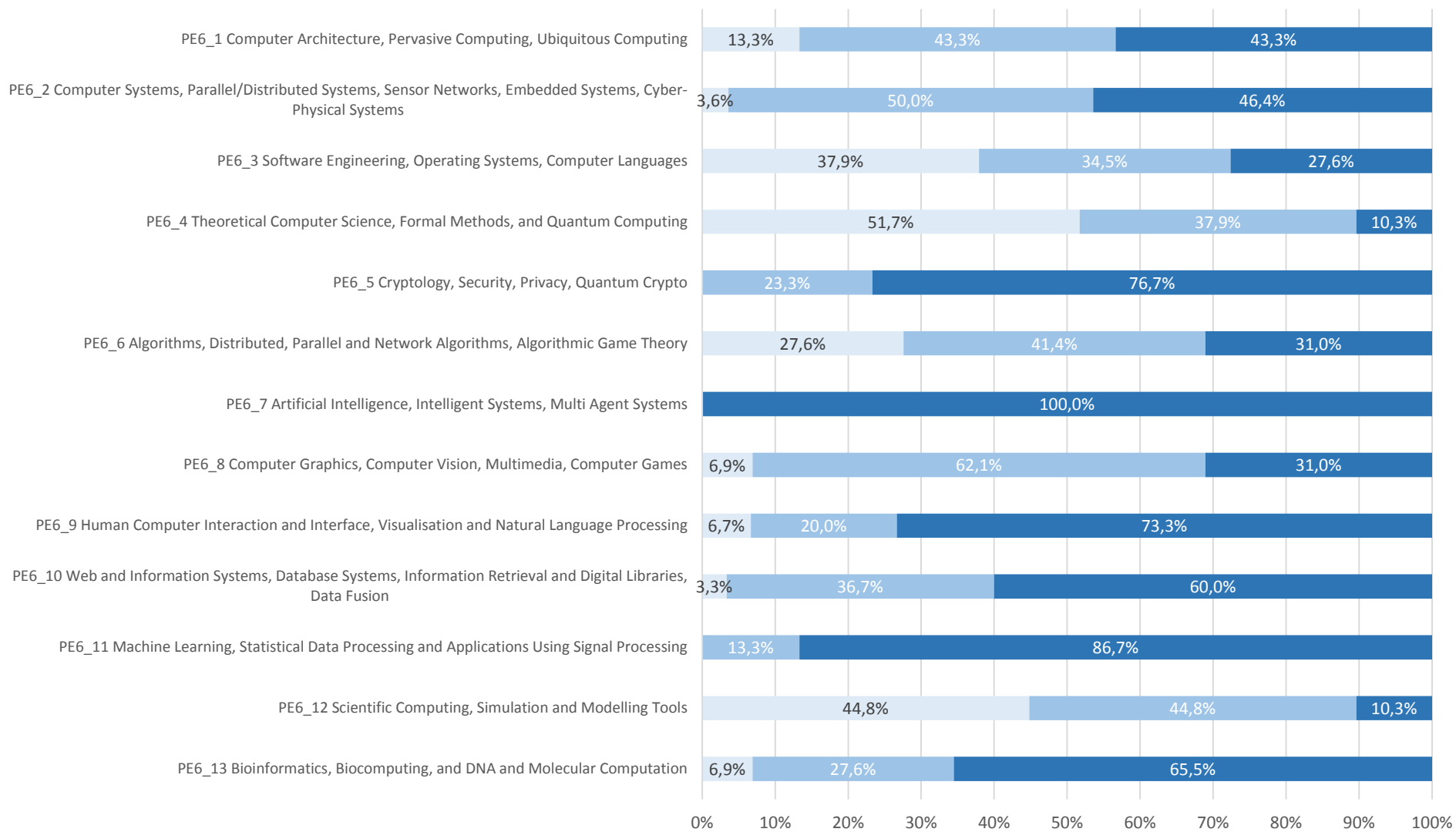


“In which areas ethical/social impact of Informatics is more evident?”

- Each ERC PE6 area is rated with its importance with respect to its ethical/social impact. Also the specific topics for each area are emphasized to better link the teaching of ethical/social aspects with the appropriate technological subjects.
- The **ERC PE6 classification** (Computer Science and Informatics) is well established. Reflects a “classical computer science point of view”. We could revise this classification, by adding new elements such as business models, legal issues, (social) media etc.
- The areas of Informatics considered to have the **greatest impact** (in increasing order) are: Artificial Intelligence and Autonomous Intelligent Systems (e.g. autonomous vehicles), Machine Learning, Cryptology, Security, Privacy, Human Computer Interaction and Bioinformatics, Web and information systems.
- The most "foundational" areas such as Theoretical Computer Science, Formal Methods, Scientific Computing, Software Engineering, Operating Systems and Computer Languages are considered to have the **least impact**, in increasing order.
- Considering the most "foundational" areas as less relevant can be misleading: it is through foundations that a computer can be **designed** in a socially responsible way.

B2. The impact of the different PE6 Areas

low medium high

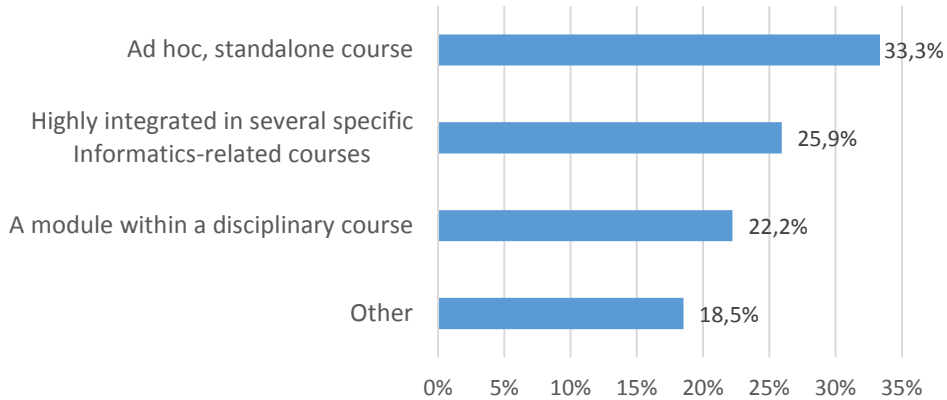


The impact of the different PE6 Areas

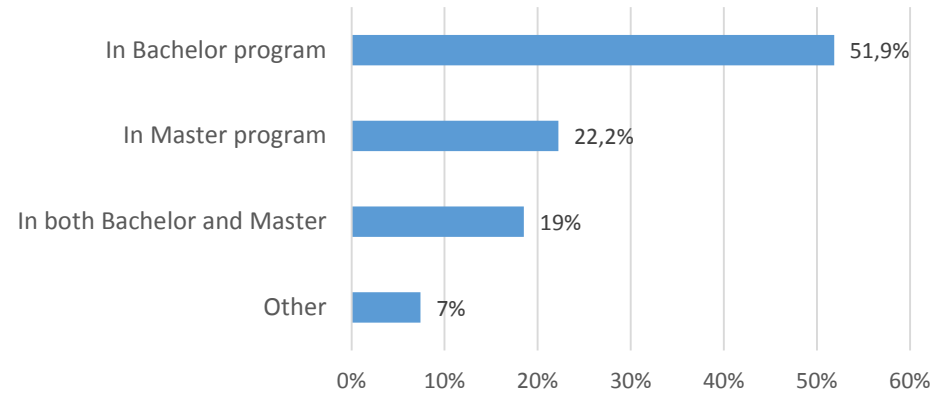
- The **PE6 areas** considered to have the **greatest impact** are, in decreasing order of importance:
 - PE6_7 Artificial intelligence, intelligent systems, multi agent systems
 - PE6_11 Machine learning, statistical data processing and applications using signal processing (e.g. speech, image, video)
 - PE6_5 Cryptology, security, privacy, quantum crypto
 - PE6_9 Human computer interaction and interface, visualization and natural language processing
 - PE6_13 Bioinformatics, biocomputing, and DNA and molecular computation
 - PE6_10 Web and information systems, database systems, information retrieval and digital libraries, data fusion.
- The **PE6 areas** considered to have the **least impact** are, in increasing order:
 - PE6_4 Theoretical computer science, formal methods, and quantum computing
 - PE6_12 Scientific computing, simulation and modelling tools
 - PE6_3 Software engineering, operating systems, computer languages.

“In which way and when the ethical/social impact of Informatics should be a subject of study?”

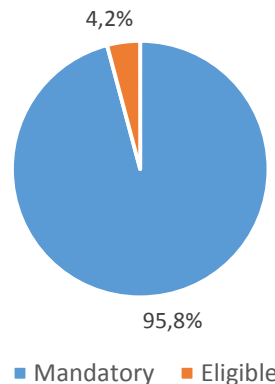
B7. In which way should the ethical/social impact of Informatics become a subject of study in Informatics university degree programs?



B8. When should the ethical/social impact of Informatics become a subject of study in Informatics university degree programs?



B10. Should a course in ethical/social impact be eligible or mandatory?

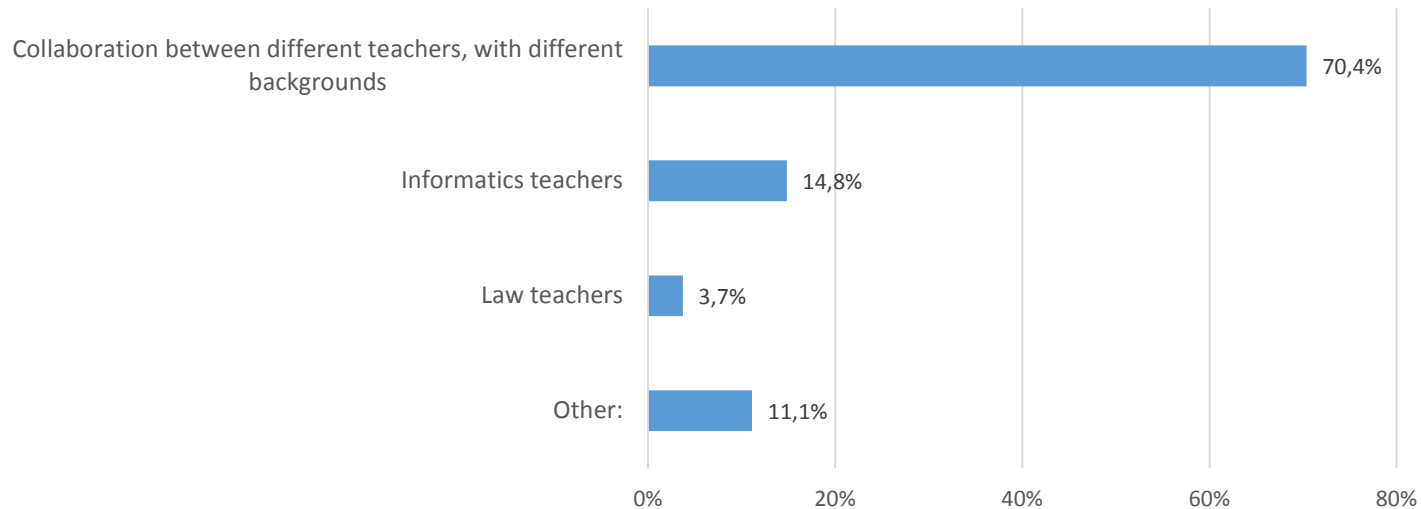


- The majority of the answers suggest that social and ethical aspects of informatics could be taught in the context of Bachelor programs (both stand-alone or integrated) and that these courses should be mandatory.

“Who should teach in these courses/modules?”

- The majority of the respondents wishes a close collaboration between different teachers, with **different backgrounds**.

B9. Who should teach in these courses/modules?



Conclusions and Future Work

- The Report is intended just as a first step and should be revised and extended in different parts. Comments and feedbacks are welcome!
- The questionnaire should be reviewed in the light of this experience and given to a wider and more varied audience?
- A (preliminary) list of some existing courses within Informatics university degree programs which address ethical/social impacts of Informatics, has been collected through the feedback of the respondents.
- The list testifies that this topic is already a well-developed academic field, with accredited institutions training huge numbers of students for Bachelor, Master and PhD degrees.
- A more complete and methodological analysis is required.
- The future work of the WG should be discussed together with WG members and in accordance with the IE board strategy.