Recommendations
on the use of AI in Informatics Education

Prepared by Informatics Europe and endorsed by its National Informatics Association members

The new, disruptive generative AI systems, such as the OpenAI tools ChatGPT [1] and GitHub Copilot [2], have taken the academic research and education community by storm [3,4]. Within academia, similarly as elsewhere, there are widespread concerns about their possible negative effects on established conventions of trust and authenticity, as well as excitement about their potential to be used as a tool to enhance human capabilities.

Against this background, there is a pressing need for guidelines and best practices for how to manage the impending transition and benefit from these new tools. In the area of Informatics education, we offer the following analysis and recommendations to the Informatics academic community.

1. These powerful automated tools will compel us to reconsider the fundamental goals of Informatics education and how to best pursue them. In the area of software development, for instance, there has been a lively debate about the future needs for basic programming skills [5-7]. At the same time there may be increased demand for broader and deeper competences in areas such as requirement specification and validation, development methodologies, algorithmic techniques, and the ethical, legal and societal aspects of software.

2. Reconsidering Informatics curricula will be necessary also because the new AI tools are being quickly adopted by students and their future employers, and universities will need to respond to this development, both to satisfy the imminent needs and expectations of the industry and to inform and support further progress. Curriculum revisions are however not a simple task at the moment, because the landscape of these new tools and their effects on the software development process are undergoing a major transition that will take some time to settle.

3. The emergence of new stable curricula will thus most likely require a few years, and the most immediate concerns are how to adapt the present frameworks to the rapid emergence of the new tools and approaches: how to benefit from them on the one hand, while constraining their misuse on the other hand.

4. One should keep clear that academic education aims at building *science-based understanding and competences,* together with *professional integrity* in applying these. Teaching should be designed to foster these goals, and students should be committed to them. Specifically in the case of the AI tools, the tools should not be used blindly, but with a critical attitude and understanding of how they work, what they provide, and what their societal impacts may be.

5. In connection to the new AI tools, at least the following four aspects of academic education require particular attention: *integrity, quality, accountability* and *societal responsibility.*

- *Integrity:* From the research and education point of view one could consider the use of AI-generated products (code, text, images) in a similar way as the use of other intellectual source materials (books, journal articles, web pages, archival code): making use of them is commendable, but claiming personal credit for them is plagiarism. There should be a clear mutual understanding of appropriate use in any given context, and any such use should be clearly indicated.

- *Quality:* All academic work should aim for high quality and counteract any risks of compromising this. AI-generated products, as appealing as they are, also contain a profusion of inherent biases, limitations and other quality concerns, including outright errors, which their user needs to recognise and act upon. A systemic flaw in many current AI tools is also their disconcerting lack of transparency, which makes the quality control of their products exceptionally demanding.

- *Accountability:* Since current AI tools come with no quality guarantees or regulatory assurances, a person using their products is accountable for the faults therein. Any failures of the AI-generated product are at this moment the responsibility of the human user, not the automated tool, no matter how opaque the tool is.

- *Societal responsibility:* Complex software often carries with it implicit ethical, legal or societal assumptions and implications that should be recognised and addressed. This is especially true of the largely opaque artefacts generated with AI tools, and the user of such tools should aim to address these concerns responsibly.

Consequently, we put forth the following recommendations:

1. Integrate the new AI tools and methodologies into existing Informatics teaching to the extent feasible and productive, and start thinking about revised curricula that take into account their long-term transformative impact.

2. Emphasise to the students the fundamental goals of academic education, and that they should personally commit to these in all their work. Specifically in the case of the AI tools, the students should understand (at some level) how the tools work and what they provide, and in particular:
    a. Use the tools for resourcing, not as a form of plagiarism.
    b. Be attentive to the quality concerns inherent in AI-generated products.
    c. Recognise that if you use an AI-generated product, then you accept responsibility for any possible failures in that product.
    d. Be attentive to and aware of the ethical, legal and societal concerns related to AI-generated products.

3. Have a discussion in your community about the policies and practices to navigate the transition, and develop an action plan for this, including:

a. Make it explicit to the students what the appropriate use policy for these tools is in any given context, and make it part of the respective Code of Conduct that they commit to this policy and indicate any use of such tools in the relevant way.
b. Encourage the teaching staff to become familiar with the AI tools and their characteristic styles and weaknesses. Promote teaching and assessment methods based on personal contact and/or progress reports rather than AI-clonable online materials.
c. Advance the teaching of social, ethical and legal aspects of computing.

References

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