Hydrol. Earth Syst. Sci. Discuss., 9, C440–C451, 2012
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Hydrology and Earth System Sciences Discussions

Interactive comment on "Experiences from online and classroom education in hydroinformatics" *by* I. Popescu et al.

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We would like to thank the Reviewer1 for taking time in reading and suggesting modification to the paper. Answers to specific comments of the reviewers follow:

Comment 1: General comments: The article describes two examples of modules for a study programme which is designed for Master's degree students and professionals. The authors have developed two types of course per module: a face-to-face course and an online course. The abstract states that the article compares the two course modes based on the authors' experiences. My feeling is that this main idea could be elaborated more concisely and clearly. The article mentions three main drivers of changes in hydroinformatics education: 1) educational change due to the Bologna reforms; 2) tension between the educational needs of academics and professionals; and

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3) technological changes. The authors give an overview of the field of hydroinformatics and briefly introduce the UNESCO IHE programme. Figure 1 is intended to visualize the structure of the latter. Here I would suggest providing a time axis, and improving the match between the figure and the explanation in the text.

Authors' answer: We would like to thank the reviewer for pointing out the three main drivers of the changes in Hydroinformatics education, and for pointing out that Figure1 needs a timeline. We have added a new figure, which will be included in the final version of the manuscript. This new figure shows the timeline, for the structure of the topics highlighted in Figure1. With this new addition the explanations in the manuscript on page 1316, line 22-27, page 1317, line 1-3 are relevant for Figure 1, and the explanations on page 1317, line 4-13 are reflected on the new added figure. Please see the figure at the end of this document which is the new figure we propose to be added to the manuscript.

Comment 2: In the following section the authors present the challenges faced in the field (rapid development in ICT, increasing demand from other sectors), and propose the areas of specialization in the programme and elective courses as the solution. The two courses they present are both elective courses.

Authors' answer: The explanation of the authors shows to be unclear. The reviewer refers to the explanation given on page 1318, lines10-15. The phrase is "The solution is to institute multiple tracks for different areas of specialization. Due to this, the content of the course has three modules for which the participants can select the content depending on their interest. The courses that are subject in this article actually belong to these elective modules. For example in one of the modules they can choose among three topics, out of which one is "Flood modelling for management", or in another one, out of five topics they can select "Decision Support Systems in River basin management". These elective courses. . ...". In the phrase the meaning of electives is that students can select (elect) a module topic, based on their own interest, from a number of topics on offer. The students will have to compulsory follow one topic, it is

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not elective in the sense that students can skip that part of the taught course. One of the choices for selection is “Flood modeling for management”, in month 8, of the 12 months of the taught part of the course; and another choice is “Decision Support Systems in River Basin management”, on month 10, out of the 12 months of the taught part. These two courses are the focus of the paper.

Comment 3: In section 3 the authors describe the face-to-face courses, and in section 4 the online courses. I believe that a different structure would be catchier: 1) prerequisites /target group: 2) describe the learning outcomes and the form of assessment (if we assume that face-to-face and online modes are just two different learning arrangements, learning outcomes and assessment should remain constant); and 3) compare the two modes with a focus on their advantages and disadavantages. A table could be effective here. This form would clarify the special needs addressed by each type of course and the different competences each fosters.

Authors’ answer: At the suggestion of the reviewer the authors are proposing a table which is summarizing similarities and differences between the two modes of delivery. The table will be included in the end of Section 2.3 of the manuscript, where the two modes of delivery of courses are introduced. The table is also attached at the end of this answer section, as table 3. As it can be seen from the above table the target audience in both online and face to face modes of delivery, is the same, though in practice we observed that a large number of participants of the online courses were water professionals or PhD researchers who volunteered to join the course to improve their skills. In the face to face version of the courses all participants were Master of Science (MSc) students, who might have had some professional experiences, but joined the course in the pursuit of obtaining an MSc degree. The learning objectives for both versions were the same. In the face-to-face version the assessments were designed to ensure accomplishing of all the learning objectives. However, in the online version, as has been explained on page 1317 line 7, we experienced difficulties in organising oral examination and/or discussion. The assessment was based primarily on the sub-

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mitted reports and to some extent on the limited discussion and students' contribution on the platform. Therefore, for example for the FMM course, the assessment of the fulfilment of the first two learning objectives (page 1320 line 10-12) was limited in the online version. The fulfilment of the other learning objectives was fully assessed.

Comment 4: The authors' experiences are presented in an unstructured manner. I suggest using a table, as mentioned above. Some concrete examples would be useful. What was the intention? How was this addressed in the face-to-face mode? How was it transposed to the online mode? The authors also take what should here still be descriptions and rush to make them conclusions, which is not yet appropriate.

Authors' answer: Please see the answer to Comment 3 above and the newly introduced table.

Comment 5: The section on course implementation contains information that is already given in the previous section. As Fig. 2 shows, implementation is about providing material. I am curious to see how the authors handled issues of exchange between students and the instructor, and how they implemented the technology (e.g. with simulations). How did they measure the student workload in the two modes (f-t-f and online)? What was the problem concerning assessment? Why couldn't students be asked to be present for the examination?

Authors' answer: In the on-line environment the exchange between instructor and student is made via three ways of communication: a forum where students pose questions, and are answered either by the lecturer, either by their fellow colleagues; a special forum called "Ask the teacher", where lecturer answers the questions and the third option is an e-mail sent directly to the instructor.

As explained in the manuscript, on page 1320, lines 11-20, simulations are shown to the students via a movie, where a step by step procedure, on how to build a model, how to simulate and how to check results, is shown. The outcome of a simulation is discussed and shown to the students in a report. In case students were having

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problems in setting up their models special sessions are held between the instructor and the student, through software such as Skype, Netmeeting, Teamviewer, etc.

Both face to face and on-line courses are organized in sequences of lectures and exercises, of defined length (as contact hours), as presented in Table 1 and 2. In Europe every contact hours has defined standards (Dublin descriptors) to evaluate the corresponding study load for a student. Because the on-line courses were structured in a similar manner, following the same lectures and exercises as in the face to face, the study load is the same.

The last issue raised by the reviewer is a misinterpretation of what we were presenting in the paper. The on-line course is not meant as a platform to provide material for the face to face students, but as a platform for running a distance education course. The on-line course aims to serve professionals all over the world, which are not present at the premises of UNESCO-IHE. Because of these reasons the examination in an on-line course is difficult since one can not identify the participant while participating in an examination, and this is why the evaluation of the on-line course as a whole is done, as mentioned, through assignments. Another reason for not using examination, was the difficulty of implementation of such a form of evaluation. The implementation of an examination entails involving another university or an institution, or an embassy, which will gather the participants to the course for examination and will check their identity. Such an undertaking proved to be expensive, and could not be implemented.

Comment 6: The discussion contains aspects and examples which in my opinion could be elaborated on further. I would suggest rethinking and restructuring the article as mentioned above: the authors should present the challenges faced in table form, and utilize the discussion to reflect upon and evaluate their experiences and thus compare the two course modes. A further suggestion: in the context of collaborative learning the authors have empirical data. They need to show the whole distribution and indicate the number of participants and respondents. They should make clear the importance of collaborative work in each module (FMM and DSS)

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Authors' answer: Though we greatly acknowledge the issue raised by the reviewer, concerning the learning via collaboration with your peers, the two courses, in both modes of delivery, presented in the manuscript, were designed in a classical teacher-centered approach where most of the learning is reached via information flow between the instructor and the learner. In both cases collaboration between students happens, either directly, either via a forum and blog and it is well appreciated by the students. The next issue raised in this comment is about the data presented in Table 3. For the DSS course we had 66 participants and a number of 50 responded the questionnaire about collaboration, and in the case of the FMM course we had 94 participants and 80 responded the questionnaires. We will add this information in the final version of the manuscript.

Comment 7: The conclusion comprises 1) open questions (assessment, being cheap, how to design online courses); 2) the effectiveness of the programme; 3) a section on how to support life-long learning for water professionals. It seems somehow detached from the experiences and comparison described in the rest of the article.

Authors' answer: The reviewer rightly pointed out that the conclusions need to be better related to the experiences and comparisons of the two courses presented in the previous sections. Therefore in the final version of the manuscript we will insert as a first paragraph in the conclusion section, a summary of the main findings presented in the previous sections. The paragraph to be inserted is: When comparing face to face and online versions of the same courses the main challenge seems to be maintaining adequate structure of presentation of the course materials. While this is straight forward during face to face course delivery, for online courses this can be achieved by gradual introduction of the course material supported with adequate exercise assignments. This is especially important for modelling courses in which generic concepts need to be introduced before actual hands on exercises with modelling tools. In online courses the discussion forum plays a critical role for enhanced learning through peer collaboration as well as active participation of the involved lecturers. When adequately

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designed and implemented this approach can act as a substitute to the group problem solving sessions normally introduced in face to face courses. The evaluation of the courses presented in this article indicate high level of students' appreciation of the collaboration realised in this manner.

Comment 8: Special comments: The authors should consider the Dublin Descriptors when summarizing the changes due to the Bologna Process.

Authors' answer: Dublin descriptors and Bologna declaration are related. Bologna declaration is an agreement, a commitment of 29 European countries, on how to reform higher education in Europe. Dublin descriptors are a consequence of the declaration, they are descriptors/ indicators for evaluating a Master of Science program and accredit it to be as required by the Bologna declaration standards. The study load of a student, based on contact hours are based on Dublin Descriptors.

Comment 9: I don't understand table 1 and table 2. The authors should make them more readable and check the numbers. Addtionally it would be interesting to compare the settings with the online-equivalents.

Authors' answer: On page 1319, line 5-7, of the manuscript it is mentioned that Table 1 and 2 show the content of the courses and the study load of the students, in accordance to the Dublin descriptors. We added extra words and lines in Table 1 and2, to make them clearer. We have added them here in the responses as well. Moreover the content and learning objective is the same for the on-line courses as for the face to face courses. This is mentioned in the manuscript on page 1322, line 6-7 and on page 1323, line 21-24. The evaluation of the students however is different in online courses, as opposed to face to face courses, because in the on-line course participants are evaluated on assignments only. The newly introduced table overview of the two modes of delivery shows these similarities and differences in a clearer way.

Comment 10: Technical comments: p 1316 L 8 -> delete "course" p1317 L5 -> insert blank between "programme" and "(WSE) Please also note the supplement to this com-

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ment: http://www.hydrol-earth-syst-sci-discuss.net/9/C373/2012/hessd-9-C373-2012-supplement.pdf

Authors' answer: We will take note of the technical comments on the revised version of the manuscript. The supplement to this comment is a file containing the comments that are available on line, therefore we do not have any other answers, they are all in this document.

All our responses to the questions raised by the referee will be included in the revised version of the manuscript.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 9, 1311, 2012.

Subjects	Contact hours [hours]			Estimated study load [hours]	Assessment
	Lecture	Exercise	Workshop		
Introduction to some application domains of Hydroinformatics: floods, urban systems and the environment	4	0	2	14	
Climate change and its impact on hydrology	4	0	2	14	
Environmental processes and water quality	6	2	2	24	
Introduction to 1D2D, 2D modelling	2		2	8	
Flood analysis, river flood modelling and 1D flood routing	10	22	0	74	Exercise report (50% weight)
New data sources to support flood modelling		2	2	6	
Total study load hours				140	Oral exam of all the subjects (50% weight)

Fig. 1. Table 1. The content and assement of the face to face and FMM course

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Subjects	*Contact hours{hours]*			*Estimated study load [hours]*	*Assessment*
	Lecture	*Exercise*	*Workshop*		
System analysis in water resources	8	6	6	42	Exercise report (35% weight)
Decision support systems	6	4	4	30	Exercise report (30% weight)
Software technologies for integration	4	8	8	36	Exercise report (20% weight)
Integration of weather prediction and water models	8	2	4	32	Exercise report (15% weight)
Total study load hours				140	

Fig. 2. Table 2. the content and assessment of the face to face DSS course

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Component	Face to face delivery of courses	On-line delivery of courses
Prerequisites		
Prerequisites/ target group	Same for both modes of delivery	
Time and study load		
Time of course delivery	3 weeks (Study load 6-7 hours/day)	10 weeks (2 hours /day)
Estimated study load	140 hours	140 hours
Learning objectives	Same for both courses	
Assessment mode	Assignment and examination	Assignment
European credit transfer load (ECTS)	5	5
Certificate for the course	No	Yes
Advantages/Disadvantages		
Pace of learning	Imposed by the timeframe of the course (disadvantage)	At students own choice (advantage)
Leave from work	Student has to leave the work and go to study (disadvantage)	Student can study while working (advantage)
Direct interaction with instructor	Immediately (advantage)	Not in the same time (disadvantage)
Direct interaction with instructor	Answer given in an oral format (disadvantage of not being able to reconsult the answer)	Instructor answers in a forum (advantage of having the answer for reviewing)

Fig. 3. Table 3. Comparisons of the face to face and online modes of delivery

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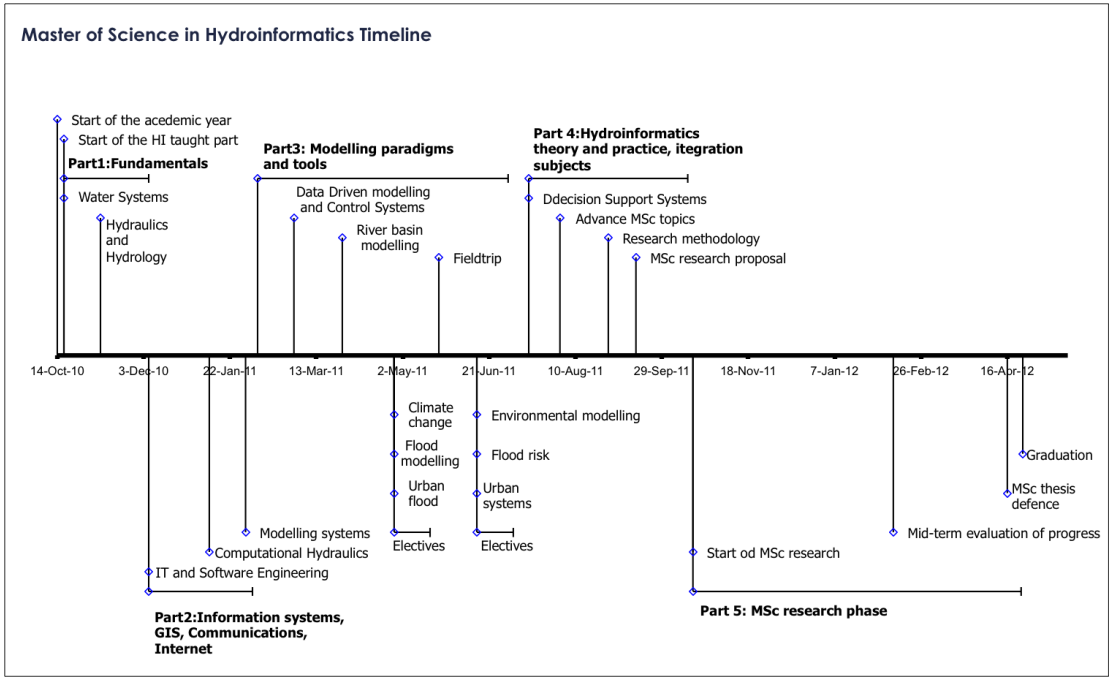

Fig. 4. The sequence of the taught topics and research period, for the 18 month of the Master course in Hydroinformatics (example of 2010-2012 batch)

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