Train DL

Teacher training for Data Literacy & Computer Science competences

D5.7 - Prototype policy and curricula recommendations (primary school teachers)

train-dl.eu

Austrian Computer Society *OCG*

1. Executive Summary

This deliverable reports on the policy recommendations for primary school teachers derived by the TrainDL project in the context of AI&DL education. This deliverable builds on the work done by the project on policy recommendations for CS teachers as reported in deliverable D5.3 "Development of policy and curricula recommendations (CS teachers)", and policy recommendations for STEAM teachers "D5.5 - Development of policy and curricula recommendations (STEAM teachers)".
For D5.3, the evolution of policy recommendations was based on following steps:

1. Initial definition of policy recommendations, based on
   a. state-of-the-art analysis of relevant policy documents and definition of a policy monitor, as reported in D1.1 and D1.2; and
   b. national policy dialog workshops in the context of WP1 with project relevant stakeholders, as reported in D1.3.
   c. A set of initial recommendations have been assessed by external experts, as reported in D5.4.
2. Refinement of the policy recommendations based on the outcomes of a joint policy building workshop with policy makers and representatives from education institutions from Germany, Austria and Lithuania (D1.6).
3. Refinement of the policy recommendations based on the evaluation of the outcomes of the first round of policy experimentation through interventions conducted in the context of WP2 (reported in D2.3 and D2.4).

Additional evaluations have been conducted in order to be able to adopt the policy recommendations to the STEAM teacher target group (as reported in D5.5):

1. Over 10 TrainDL project interventions with participation of STEAM teachers from Austria, Germany and Lithuania (more than 50 participants from STEAM fields) for which feedback was collected in formal and informal discussions. The STEAM interventions were conducted as part of work package 2 according to the guidelines reported in D1.7.
2. Formal qualitative and quantitative evaluation results for interventions with STEAM teacher participation which were reported in D4.5.
3. Research of policies on the European level, as reported in D1.9 (resulting in the extended on-line policy monitor delivered through D1.11).

Finally, following evaluation results (from WP4) from interventions with primary teachers (WP3) have been taken into account for the primary school teacher target group covered in this deliverable D5.7:

1. Over 10 TrainDL project interventions with participation of primary school teachers from Austria, Germany and Lithuania (more than 60 primary school teacher participants) for which feedback was collected in formal and informal discussions. The primary interventions were conducted as part of work package 3 according to the guidelines reported in D1.10.
2. Formal qualitative and quantitative evaluation results for interventions with primary school teacher participation which were reported in D4.6.

3. Research of policies on the European level, as reported in D1.9 (resulting in the extended on-line policy monitor delivered through D1.11).

Contrary to the original representation of the policy recommendations in D5.3 for the CS teacher target group (which comprised a set of concrete policy recommendations including a set of actionable mechanisms to implement each recommendation), the format has been adopted for this deliverable D5.7 (as well as for D5.5) to a representation that combines policy recommendation and implementation suggestions. This change has been made after thorough discussions, based on feedback given from both the TrainDL steering committee, the stakeholders, the advisory board and policy makers as well as the target group participants in the various interventions conducted by the project. It has become evident that at this stage of policy recommendation development, a representation that introduces the policy and provides a guiding direction towards how a concrete implementation would look like is seen more appropriate than a set of concrete actionable items. It should be noted that the TrainDL project will have a concluding deliverable in this series "**D5.9 - Set of consolidated recommendations**" in which the policy recommendations for all three target groups (CS, STEAM, Primary) will be revisited and finalised, providing an opportunity for a further revision of the policy representation format.

The main result of this iteration are the policy recommendations listed in Section 2. The main outcome of the investigation and evaluation with the primary school teacher target group has shown many similarities with STEAM teachers. Like with the STEAM teacher target group, the primary school teacher target group faces in general a lack of background in relevant CS topics, as well as a lack of time for teaching additional topics in the usually overcrowded curricula. Therefore, a core outcome of the investigation and evaluation in the primary school teacher target group is similar to those for the STEAM teacher target group: In order to successfully integrate AI&DL into the curricula of primary school teachers, two types of mechanisms are necessary:

1. The provision of materials and recommended content for lessons
2. Training for in-service teachers as well as education for pre-service teachers

Additionally, due to the young age of students in the primary target group, special attention is required to tailor content that appeals to children and nurtures their interest in AI&DL topics."

1. Course content and formats need to be especially adopted for this target group. Playful approaches should be favoured
2. The involvement of parents might also be an important factor to convey the importance of AI&DL topics to the children

The policy recommendations listed in Section 2 are based on those outcomes.

2. Policy recommendations – Primary

The results presented in this Section are a set of policy recommendations for the primary school teacher target group, derived according to the steps presented in the executive abstract. The main source of input for the primary school teacher target group were the primary interventions conducted by the project (WP3), allowing to gather qualitative and quantitative input from more than 60 primary school teachers from Germany, Austria and Lithuania, which was formally evaluated and validated by the project, as reported in WP4 (D4.6.). It should further be noted that recent policy documents identified in the latest round of policy research, like the very recent publication (August 2023) by the Austrian Federal Ministry of Education, Science and Research, provided valuable new insights regarding the state of policy support in AI education[1].

Policy Recommendation 1 (Focus and Methods)
• **Ready-to-use materials**: Ready-to-use materials are of central importance for incorporating the topics of AI&DL into lessons at primary school level in a meaningful way. Among other things, FAQs with the most frequently asked questions from children and parents can be helpful, as teachers at primary school level usually have little to no knowledge about the topics of AI&DL, as the TrainDL validation with this target group has shown.
• **Raising awareness**: Creating awareness should be the main focus when training primary school teachers, as the topic of AI&DL is mostly unfamiliar territory. Therefore, the content should not focus too much on technical aspects but also on the application of the knowledge as well as risks and opportunities of AI.
• **Potential benefits**: To prevent the topic of AI&DL from becoming another exhausting obligation in the curriculum, it is important to emphasize the potential benefits. As there is no separate subject for AI&DL at primary school level, the topics need to be incorporated into the curriculum and the regular lessons in a meaningful way. Applications in the organisational context should also be addressed, e.g. using AI for administrative tasks or preparing teaching materials or lessons.
• **Potential risks, ethical aspects & data protection**: It is essential that teachers also inform students about the potential risks and ethical aspects that the use of AI&DL can entail. In this context, the topic of data protection should also be part of the teacher training.
• **Tinkering**: In general, both teacher training and the use of AI&DL as well as corresponding tools should be based on a tinkering approach following the principles of constructionism. Especially for primary school teachers and also students a playful, unplugged approach should be the focus. Teachers as well as students should be able to try out, play and experiment with AI&DL tools in order to gain their own experiences.

---

[1] „Auseinandersetzung mit Künstlicher Intelligenz im Bildungssystem",
https://www.bmbwf.gv.at/Themen/schule/zrp/ki/ki_asbs.html

Policy Recommendation 2 (Teacher Training formats for in-service primary school teachers)
• **Course formats**: There are various options for organizing the courses for teacher trainings. In any case, a combination of different course formats should be used for primary school teachers. Overall, there is the option of on-site education, online education, hybrid settings, blended-learning or flipped classrooms. • **Teaching process**: The training for primary school teachers should focus on a combination of mandatory on-site courses for the introduction to the topics of AI&DL and the general concepts and course content as well as supplementary online course modules. Online formats can be used to optimally supplement teacher training and teachers can gain in-depth knowledge of the topics at their own pace and investigate tools and activities independently. • **Course structure**: For primary school teachers the playful approach should be also the main focus of the teacher training. • **Overcoming obstacles**: The lack of technical infrastructure in many primary schools and how to deal with this issue should be taken into account in the teacher trainings already.
Policy Recommendation 3 (Education for pre-service teachers)
• For primary school teachers the topics of AI&DL should already be included in the education of pre-service teachers at university and become an integral part of the curriculum.
Policy Recommendation 4 (School Curricula)
• AI&DL subjects should carefully be integrated into school curricula, as these are already mostly overfilled. It is important to be careful not to risk a loss of interest in AI&DL by further overfilling the compulsory courses.
Policy Recommendation 5 (Certification for schools)
• A qualification/certification in the field of AI&DL for entire schools should be considered. Such AI&DL certifications confirm – for instance - that the teaching staff of a school has completed all necessary trainings in the field of AI&DL.
Policy Recommendation 6 (Involvement of Parents)
• In general, parents might also be involved in this process for primary schools. Teachers should also be enabled to create awareness among parents and to emphasize the importance of AI&DL.

3. Discussion and Conclusion

One of the main outcomes of formally validating the qualitative and quantitative input provided by primary school teachers in the context of TrainDL project activities was that in many aspects, the needs of primary school teachers are very similar to those of STEAM teachers. Both the lack of adequate CS background to create their own teaching materials in AI&DL topics, as well as the lack of time to teach additional topics like AI&DL due to already tightly packed curricula are identical to the issues faced by STEAM teachers. Primary school teachers should be enabled to understand the basic concepts of AI&DL and to apply them in a meaningful way in everyday

school life and to teach them to students. In primary education, it is crucial to focus on introducing topics in a way that ensures low barriers to entry.

Also, at primary school level the topic of proper teacher training in AI&DL is essential to avoid the spread of superficial knowledge about AI&DL among teachers and students. Therefore, teachers must be adequately qualified to pass on knowledge about AI&DL.

Similar to the STEAM teacher context, in order to successfully integrate AI&DL into the curricula of primary school teachers, two types of mechanisms are necessary. On the one hand, the provision of materials and recommended content for lessons. And on the other hand, training for in-service teachers as well as education for pre-service teachers.

Furthermore, the young age of students in this target group requires adaptation of teaching material and teaching approaches to this context. Playful approaches to learning as well as the involvement of parents to get young students interested in AI&DL topics and keep them motivated could be promising ways to address this aspect.

It should be noted that the recommendations of this round of policy experimentation are still in a draft state. The project has further actions of development and experimentation planned. The recommendations for both STEAM and primary educations will undergo an expert review and the outcomes of this review will be presented in deliverables D7.6 and D7.8 respectively. A final deliverable D5.9 that will report on the last iteration of policy experimentation, with a consolidated set of policy recommendations and actionable mechanisms for CS, STEAM and primary education target groups is to be delivered towards the end of the project. This last iteration will further elaborate, revise and extend the recommendations. A draft set of consolidated recommendations will be presented to stakeholders and policy makers within the scope of the final policy dialogue (D1.12) as part of the TrainDL Final Summit (WP7), with expert feedback considered for the final version of D5.9.