Technology Curriculum and Planning for Technology in Schools: The Flemish case

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Flanders and the new educational technology curriculum

Flanders is the Dutch-speaking part of the Belgium federal state. The Flemish community—just like the French- and German-speaking communities—has legal responsibilities within the domains of welfare, education, culture, language, or public health. These policy domains are no longer national policy areas and thus come within the purview of the Flemish Government (Ministry of the Flemish Community, 2005).

As a significant step in the consolidation of the importance of technology in education, the Flemish Government recently (September 2007) introduced a formal technology curriculum for schools. This compulsory curriculum replaces already existing but non-binding technology guidelines (Tondeur, van Braak & Valcke, 2007) and is an important action in the Flemish policy of educational technology support. The introduction of a technology curriculum brings educational technology in schools to a turning point: Technology is no longer considered as being dependent on teachers' individual efforts or willingness, but is becoming compulsory at the school level (see also Vanderlinde, van Braak & Hermans, 2007).

The Flemish educational technology curriculum is written in terms of attainment targets. These targets are minimum objectives concerning the knowledge, insight, skills, and attitudes the government regards as necessary for and attainable by pupils at different educational levels. The formulation of attainment targets is an important principle in Flemish educational policy, which can be characterised as a decentralised policy system. Such a policy system limits the role of the central government authorities and stresses local school autonomy.

1. Pupils have a positive attitude towards educational technology, and are willing to use educational technology to support their own learning process.
2. Pupils use educational technology in a safe, responsible and effective way.
3. Pupils can work independently in a learning environment enriched by educational technology.
4. Pupils can learn independently in a learning environment enriched by educational technology.
5. Pupils can use educational technology to elaborate their ideas in a creative way.
6. Pupils can use educational technology to search for, process and store digital information.
7. Pupils can use educational technology to present information to others.
8. Pupils can use educational technology to communicate in a safe, responsible and effective way.

Table 1. Framework for educational technology attainment targets in Flemish elementary education (http://www.ond.vlaanderen.be/dvo/ICT/ICT_BVR.pdf)

The technology attainment targets are cross-curricular and do not focus on the achievement of technical skills, but emphasize the integrated use of technology within the learning and teaching process (see Table 1). The attainment targets are formulated as competencies and should foster pupils' ability to use technology in a functional way to both support and reinforce the learning process.

The introduction of a compulsory technology curriculum by the Flemish Government is driven by concerns about coping with social inequity (Vandenbroucke, 2007). In line with European policy plans (see the Lisbon European Council of March 2000), every child should be digitally literate when leaving compulsory education. Other policy goals refer to the economic importance of technology and its increasing impact in society. To support the implementation of the technology attainment targets, the government has also launched other initiatives, e.g. resources for schools to appoint a technology coordinator, technology training courses for teachers, budget for infrastructure, etc.

The attainment targets are formulated in broad terms, providing schools with strong autonomy and responsibility to translate these targets into teaching and learning activities according to each school's vision. It is up to the schools to integrate technology in a way which is consistent with the personal approach as to what constitutes effective education, as provided in a school's development plan and its vision and mission statement (Vandenbroucke, 2007).

Technology planning and planning for technology

Various conditions and variables determine the use of technology in education. In this respect, researchers have focused on both teacher characteristics and school conditions. Based on an extensive review of the literature on technology integration, Hew and Brush (2007) have identified different strategies that foster the process of integrating technology into the curriculum for instructional purposes. One such strategy is labelled as "having a shared vision and technology plan" and is also considered as an important lever for successful technology curriculum implementation by the Flemish Minister of Education (Vandenbroucke, 2007). Flemish schools are being challenged to reflect on their vision on education and technology integration. Moreover, they are also being encouraged to write a technology plan that guides teachers while putting the technology attainment targets into practice.

Generally, technology plans can exist on different levels (Fishman & Zhang, 2003; Jones, 2003): Nations, states, districts and schools can all write technology plans. Although their specificity will vary in accordance with the policy level, technology plans serve as blueprints for what education with technology should look like (Fishman & Zhang, 2003).

A school-based technology plan can be defined as a school document that contains elements concerning the integration of educational technology (van Braak, 2003), or as a document that contains activities to bring the new technology curriculum into practice. In a school-based technology plan, a school describes its expectations, goals, content, and actions concerning the integration of technology in education (van Braak, 2003). The document contains strategic elements (e.g., what are the schools' ambitions?) as well as operational elements (e.g., which steps shall we take to realise our ambitions?). Generally, a school-based technology plan acts as a blueprint for the sequence of events a school hopes to achieve, describes the overall philosophy of technology, and explores how technology will improve teaching and learning (Baylor & Ritchie, 2002). This includes elements such as vision building, professional development, technology skills, technology curriculum, hardware and software, funds, etc.

Several authors (Baylor & Ritchie, 2002; Bryderup & Kowalski, 2002; Tondeur, van Keer, van Braak & Valcke, in press) argue that a school-based technology plan is a crucial step towards the practical implementation of integrating technology in education. Tondeur, van Keer, van Braak and Valcke (in press) found, for instance, that teachers in schools which have an explicit technology plan that stresses shared goals used educational technology more regularly in their classroom, and Jones (2003) found a strong relationship between school policies and changes in the classroom.

In this context, Fishman and Pinkard (2001) make an interesting distinction between 'Technology Planning' and 'Planning for Technology'. The first concept focuses on the hardware, software and support issues that arise as technology is introduced in schools, whereas the second concept underlines that the starting point for a school is a shared vision on teaching and learning enabled by technology rather than the technology aspects mentioned in the first concept (see also Jones, 2003). The first concept refers to administrative tasks, and the second to instructional and curricular concerns.

Certain conditions (based on: Fishman & Pinkard, 2001; Fishman & Zhang; 2003; Gülbahar, 2007; Hew & Brush, 2007; Tearle, 2004; Tondeur, van Keer, van Braak & Valcke, in press; van Braak, 2003) can be identified as crucial for the process of successful technology planning:

1) The schools' vision on teaching and learning is an important point of departure. It means that schools question their core philosophies of learning and instruction and identify how technology can support their vision. The schools' vision on 'good' education is the core of a school-based technology plan (van Braak, 2003) and, without such a vision, teachers are prone to limit their thinking about technology to 'boxes and wires' or isolated computer skills (Fishman & Pinkard, 2001).
2) Writing a technology plan is a 'never-ending story'. Technology planning is an ongoing process and a technology plan needs frequent updates because technology is constantly evolving and because teachers and students gain confidence, experience, and skills with educational technology (Fishman & Zhang, 2003). In other words, a technology plan is a 'dynamic working document' (van Braak, 2003) and continuous improvement and revision of such a plan is as important as the development of the technology plan itself (Gülbahar, 2007).
3) The process of establishing a school-based technology plan is a collaborative one in which all teachers need to be involved. A technology plan only has an impact on technology integration in the classroom when teachers are aware of its content (Tondeur, van Keer, van Braak & Valcke, in press). Teachers need to participate in the school's decision-making processes regarding the use of educational technology. Technology goals need to be shared and teachers must be involved in setting the means to attain these goals. Tearle (2004) speaks about a culture of collaboration and collective endeavour.

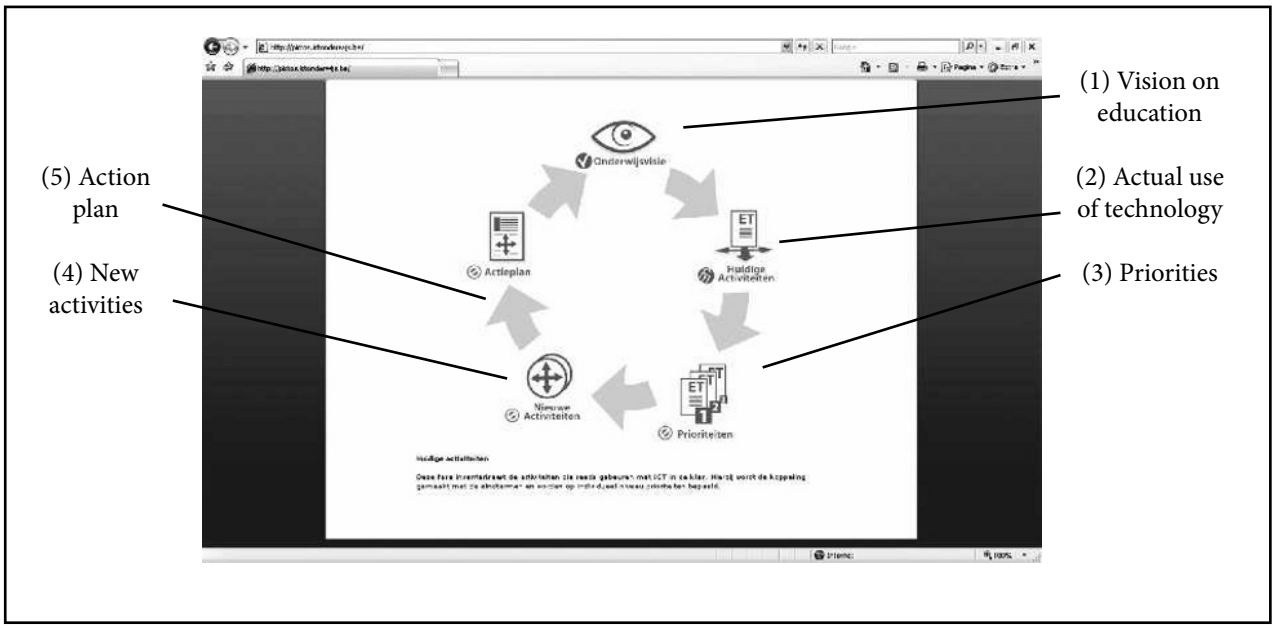

Figure 1. Screen shot of the opening page of PICTOS: Steps in the cyclic process of technology plan development

It seems that a shared vision on education and the use of technology for educational purposes, in combination with the joint process of working on a technology plan, have potential benefits for successful technology curriculum implementation. In this way, a technology plan provides profound consideration of how technology fits into the organization and contributes to its reform goals (Fishman & Zhang, 2003).

Flemish online tool PICTOS

Given the positive opinions in the literature about technology planning and the fact that Flemish schools are being encouraged to develop a technology plan, a tool has been developed to support schools in this process. This tool is called PICTOS (Planning for ICT on School) and has been developed by order of the Flemish Government. The main idea behind it is to assist schools as they put the new technology curriculum into practice and to offer a platform for the development of a technology plan. Registered schools can consult PICTOS online (*http://pictos.ictonderwijs.be*) and PICTOS can be used as a basis for a staff-development programme to help schools establish their own context-specific technology plan.

PICTOS has been developed as a joint project between the government (Flemish Department of Education), a technology in-service teacher-training centre (Regionaal Expertisenetwerk), a research institute (Department of Educational Studies of Ghent University) and a commercial IT company (Edu-Vision). The generic ADDIE-model (see Gustafson & Branch, 2002) has been used as the design model.

Based on the literature (see above), five design principles have been identified which, at the same time, act as characteristics of PICTOS:

Writing a technology plan is a cyclic process. This means that drawing up a technology plan is a process which goes through different steps. The steps provided in the online tool are:

1. Gaining insight into teachers' vision on education
2. Making an inventory of the actual use of technology
3. Setting priorities (based on the Flemish attainment targets)
4. Considering new activities
5. Drawing up an action plan

Every step is supported by specific software and leads to school output (e.g. graphs and inventory tables) based on information provided by teachers. The output from every step is the basis for a team discussion and introduces the next step. Figure 1 is a screen shot of the opening page of the online tool and illustrates the five steps that schools have to take while developing their technology plan.

Formulating a shared vision on education as the foundation of a technology plan. The jumping-off point of technology plan development in PICTOS is the creation of a shared vision on the nature of 'good' education, because this is a seen as a crucial condition for success (see above). When using the tool, the first step for participating teachers is to complete an online survey to map their beliefs about good education. This survey is based on a validated questionnaire (Hermans, van Keer & van Braak, 2007) and a general distinction is made between transmissive (or teacher-centred) and developmental (or pupil-centred) beliefs. After filling in the survey, participating teachers' beliefs on education are plotted in a graph representing the combination of two types of educational beliefs at the school level. Gaining insight into the teachers' vision on education serves as a basis for debating and delineating a shared vision on education in general, and on the supportive role of technology in education in particular.

Developing a technology plan is a concern of the whole school team. A technology plan can never be written by one person, for instance the technology coordinator, but is a concern of the whole school team. Only when all teachers participate in the process of establishing a technology plan and contribute to the content of that plan do they become aware of the expectations as regards their own role and responsibilities. One crucial element is that teachers themselves can position their own technology goals and priorities.

Technology planning is a strategic process and oriented toward a future course. A technology plan never has an 'end point' because writing a technology plan is a strategic and forward-looking process. The strategic character of the technology plan implies that the plan acts as a blueprint for technology implementation. This also means that appropriate attention is needed for issues such as time scheduling, monitoring, and evaluating the technology plan. In this way, a technology plan becomes a 'dynamic working document' (van Braak, 2003).

In addition to the steps above, PICTOS has also an administrative environment developed for the schools' technology coordinators. The technology coordinator is responsible for the registration of some data about school features such as available hardware and software, Internet connections, etc. The coordinator also defines the strategy of policy planning, including the establishment of a technology steering group, division of tasks, and collaboration with stakeholders. These data can be consulted by teachers while working on the five steps of the cyclic process.

To conclude, the formulation of a compulsory technology curriculum opens new perspectives for Flemish schools when working on putting technology into practice. Schools are challenged to translate the technology curriculum into concrete teaching and learning activities. For this purpose, they can use the online tool PICTOS to establish their school-based technology plan. Such a plan can act as a blueprint for teachers when implementing the technology attainment targets, especially when this plan is broadly supported by all team members and reflects the schools' vision on 'good' education.

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