Using an online tool to support school-based ICT policy planning in primary education

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Abstract

An important step towards the successful integration of information and communication technology (ICT) in schools is to facilitate their capacity to develop a school-based ICT policy resulting in an ICT policy plan. Such a plan can be defined as a school document containing strategic and operational elements concerning the integration of ICT in education. To write such a plan in an efficient way is challenging for schools. Therefore, an online tool [Planning for ICT in Schools (pICTos)] has been developed to guide schools in this process. A multiple case study research project was conducted with three Flemish primary schools to explore the process of developing a school-based ICT policy plan and the supportive role of pICTos within this process. Data from multiple sources (i.e. interviews with school leaders and ICT coordinators, school policy documents analysis and a teacher questionnaire) were collected and analysed. The results indicate that schools shape their ICT policy based on specific school data collected and presented by the pICTos environment. School teams learned about the actual and future place of ICT in teaching and learning. Consequently, different policy decisions were made according to each school’s vision on ‘good’ education and ICT integration.

Keywords

case study, ICT curriculum, ICT policy planning, online tool, primary education.

Introduction

Several strategies and conditions have been described in the research literature as contributing to the use of information and communication technology (ICT) in educational settings (e.g. Hew & Brush 2007; Tondeur et al. 2008). Traditionally, researchers have focused on individual teacher characteristics such as attitudes to technology or gender differences. Recently, however, attention has shifted to school-level characteristics that lead to successful ICT integration (e.g. Tondeur et al. 2008). Examining school characteristics (e.g. leadership) or school conditions (e.g. infrastructure) is useful for understanding which factors best explain successful integration of ICT in teaching and learning. Based on a review of the research literature, Hew and Brush (2007) identified one important school-level condition as ‘having a shared vision and ICT policy plan.’ This specific condition – further defined as ICT policy planning – is the focus of this study.

The complex process of ICT policy planning which is described in this article is situated within the Flemish ICT policy context. We further present a previously developed online tool [Planning for ICT in Schools (pICTos)] which supports schools in the policy planning process. Following this, we outline a multiple case study research carried out to explore the process of ICT policy planning in three primary schools, and the supportive role of pICTos within this process.
ICT policy planning

An important step towards the successful integration of ICT in schools is to facilitate their capacity to develop a local ICT policy (e.g. Hew & Brush 2007). ICT policy needs to be grounded in a shared vision of teaching and learning and ICT integration (Vanderlinde et al. 2009). Furthermore, local ICT policy must be related to particular curriculum content and to the enhancement of student learning (Staples et al. 2005 in Hew & Brush 2007), and should be reflected in a school-based ICT policy plan (Picciano 2006).

A school-based ICT policy plan can be defined as a comprehensive school document containing a variety of strategic and operational elements concerning the integration of ICT in teaching and learning (van Braak 2003; Frazier & Bailey 2004). It describes the overall philosophy of ICT use, and explores how ICT will improve teaching and learning (Baylor & Ritchie 2002). As such, an ICT policy plan acts as a blueprint for the sequence of events a school hopes to achieve. In an ICT policy plan, a school describes its expectations, goals, contents and actions concerning the integration of ICT in education. This includes elements such as vision building, professional development, ICT curricula, and ICT planning and evaluation (van Braak 2003). ICT policy planning and the establishment of a school-based ICT plan can act as a lever for successful ICT integration (Vanderlinde et al. 2009). Bryderup and Kowalski (2002) argue that creating an ICT plan is a crucial step towards the practical implementation of the integrated use of ICT. Research indicates that schools that are successful in integrating ICT are often guided by an ICT plan (Baylor & Ritchie 2002). More recently, Tondeur et al. (2007) found that teachers in schools with an explicit ICT policy plan that emphasizes shared goals tend to use ICT more regularly in their classrooms. This finding reflects the strong relationship found between school policies and changes in the classroom (Jones 2003). ICT policy planning is a way of solving problems that emerge during the ICT integration process (Gülbahar 2007). According to Gülbahar (2007), such planning is not only about hardware and internet connections, but about how ICT is integrated within the instructional programme.

School improvement literature shows that the process of creating policy plans is more important than the actual product or plan (e.g. Stoll 2003). Following a school improvement perspective, certain conditions can be identified as crucial for the process of successful school ICT planning. The first condition, 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 ICT can support this vision (Fishman & Pinkard 2001; Fishman & Zhang 2003; van Braak 2003). The second condition refers to ICT policy planning as an ongoing process. An ICT policy plan needs to be frequently updated because technology is constantly evolving and teachers and students gain confidence, experience and skills with ICT (Fishman & Zhang 2003). In other words, a technology plan is a dynamic working document, and continuous improvement and revision of such a plan is as important as the development of the plan itself (van Braak 2003; Picciano 2006; Gülbahar 2007). The third condition concerns the idea that ICT policy planning should be a collaborative process requiring the involvement of all teachers. A policy plan only has an impact on ICT integration in the classroom when teachers are aware of its content. Teachers need to participate in the school’s decision-making processes regarding the use of ICT in education. Goals need to be shared and teachers must be involved in setting the means to attain these goals (Katz & Williams 2002; Picciano 2006; Tondeur et al. 2007).

Despite the potential benefits of school-based ICT policy planning, research on this complex phenomenon is rather recent and underexposed (Fishman & Zhang 2003). Moreover, for schools, it is a challenging journey to develop local ICT policy capacity and they are often left to their own devices to develop an ICT policy plan.

Research context: Flemish ICT curriculum development

The government of Flanders, the Dutch speaking part of Belgium, recently administered a compulsory ICT curriculum to primary schools. The formulation of an ICT curriculum causes a shift in the policy actions of ICT support, i.e. from a technical rationale with a main focus on funding and resources to a pedagogical rationale stressing student competencies (Vanderlinde et al. 2009). The Flemish ICT curriculum is written in terms of attainment targets (ATs), which are defined as minimum objectives regarding ICT knowledge, skills and attitudes viewed by the government as necessary for
and attainable by all students in compulsory education. The ICT ATs do not focus on technical skills, but emphasize the integrated use of ICT within the learning and teaching process (see Table 1).

Table 1. The ICT ATs for Flemish primary education.

<table>
<thead>
<tr>
<th>AT</th>
<th>Description</th>
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<tbody>
<tr>
<td>AT 1</td>
<td>Students have a positive attitude towards ICT, and are willing to use ICT to support their own learning process.</td>
</tr>
<tr>
<td>AT 2</td>
<td>Students use ICT in a safe, responsible and effective way.</td>
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<tr>
<td>AT 3</td>
<td>Students can work independently in an ICT-enriched learning environment.</td>
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<tr>
<td>AT 4</td>
<td>Students can learn independently in an ICT-enriched learning environment.</td>
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<tr>
<td>AT 5</td>
<td>Students can use ICT to elaborate their ideas in a creative way.</td>
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<tr>
<td>AT 6</td>
<td>Students can use ICT to search for, process and store digital information.</td>
</tr>
<tr>
<td>AT 7</td>
<td>Students can use ICT to present information to others.</td>
</tr>
<tr>
<td>AT 8</td>
<td>Students can use ICT to communicate in a safe, responsible and effective way.</td>
</tr>
</tbody>
</table>

ICT, information and communication technology; ATs, attainment targets.

and ICT planning and take into account the new Flemish ICT curriculum. For a detailed description of the tool and its underlying design principles, see Vanderlinde et al. (2008). The tool is used by schools in the context of a staff development programme and supports school teams in the establishment of their own context-specific ICT policy plan. School teams are challenged to learn about the actual and future role of ICT in education. The main characteristic of the online tool is the cyclical process (see Fishman & Zhang 2003) of ICT policy planning. This means that writing an ICT plan is a process of going through different steps. Five steps are provided in the pICTos environment (see Fig 1).

1 Gaining insight into teachers’ vision on education. A central characteristic of pICTos is its starting point in gauging teachers’ and schools’ vision on the nature of good education and the processes of learning and instruction (see also Fishman & Pinkard 2001). In the first step, teachers have to complete an online survey to ‘map’ their beliefs about good education. The survey makes a distinction between two different orientations towards the nature and content of good education (Woolley et al. 2004; Hermans et al. 2008): transmissive (teacher-centred) and developmental (student-centred) beliefs. After filling in the survey in pICTos, teachers’ beliefs on education are plotted in a graph representing a combination of the two types of educational beliefs at the school level. Each teacher receives a score for transmissive as well as developmental beliefs. The belief scales have been validated in previous research (see Hermans et al. 2008). Four combinations are possible (see Fig 2 in the results section). The three most frequently occurring combinations (30% each) are (a) a high score for both dimensions (upper right); (b) a low score for developmental beliefs and a high score for transmissive beliefs (upper left); and (c) a high score for developmental beliefs and a low score for transmissive beliefs (bottom right). The least occurring combination (10%) is (d) a low score on both dimensions (bottom left). In the school graph, each teacher’s set of beliefs are plotted (see Fig 2 in the results section) and serve as a basis for reflection about the school teams’ vision on education in general, and the role of ICT in teaching and learning in particular.

2 Making an inventory of the actual use of ICT. In this step, teachers register which ICT activities are
currently performed in their classroom practice. The main goal of this phase is to make an inventory of existing ICT activities and to link them to the ICT ATs.

3 Setting priorities. In this step, a school team indicates which ICT ATs need more attention in future classroom and school practice. Based on priorities of individual teachers, a schematic outline is prepared leading to a group discussion and team decision concerning which ICT ATs deserve priority attention. Priorities are formulated for each teaching grade.

4 Considering new activities. In this step, teachers register new ICT activities. The prioritized ICT ATs from the previous step serve as a starting point. Teachers are encouraged to work per teaching grade. This approach encourages teachers to jointly design new ICT activities. In this step, teachers behave as curriculum designers. In addition, teachers can point out which conditions need to be fulfilled in order to more easily integrate the new activities into classroom practice (e.g. after school training, purchasing hardware and software, etc.).

5 Drawing up an action plan. In the last step, a school team determines what actions are needed to optimize the current ICT activities and to implement the elaborated learning and teaching activities which are consistent with the ICT ATs. Data from the fourth step serves as a basis for debate and decision-making. In this step, concrete policy actions and accompanying deadlines are formulated.

Next to these five steps, pICTos has an administrative module developed for the schools’ ICT coordinator. This person is responsible for the registration of school-specific data, such as available hardware and software, internet connections, composition of the ICT steering group, ICT professional development activities, collaboration with stakeholders, etc.

Every step in the pICTos environment is supported by specific softwares and leads to school output (e.g. graphs and inventory tables) based on the information provided by the teachers. The output of every step is the basis for a team discussion and all steps are the responsibility of the whole school team. The results of the team decisions in combination with the pICTos output serve as the blueprint for the schools’ ICT policy plan.

Purpose and method
The general research purpose of this study is to grasp the underlying processes of school-based ICT policy
planning. This refers to issues around policy planning, policy-related school decisions and the contents of ICT policy plans. Underlying this research focus is the question of how schools use the pICTos environment as an online supporting tool while establishing their ICT policy plan.

This present study is part of a broader developmental research project as the results of the study contribute to two aspects of a research study: product improvement on the one hand, and knowledge growth on the other hand (van den Akker 1999; Richey et al. 2004). In other words, the results of this study not only contribute to knowledge gain in the field of local ICT policy planning, they are also part of a broader evaluation study of pICTos leading to a redesign of the pICTos environment.

In line with the research purposes of the study reported here, a multiple case study research design (Yin 1989) was used to examine the process of school-based ICT policy planning in three Flemish primary schools. This kind of research design is very useful for tool development research (Richey et al. 2004).

Data collection and analysis

In the three case study schools, data was collected from multiple sources to enhance data triangulation. First, semi-structured interviews were conducted with school leaders and ICT coordinators. The interviews took place before, during and after the pICTos staff development programme. For each school a follow-up interview with the school leader and the ICT coordinator was conducted 1 year after the school finished the pICTos staff development programme in order to grasp the cyclical process of policy plan development. Second, different documents were studied, e.g. the school website, the schools’ mission statement, inspectorate reports and school ICT policy documents. School-specific results provided by pICTos were also collected. These included the results from the five steps of the cyclical process of pICTos and data provided by the ICT coordinator in the administrative module. Third, a questionnaire was administered to teachers assessing their experiences and attitudes towards the process of ICT policy planning in general and the use of pICTos in particular. Fourth, field notes from the researchers as participant observers were collected during the whole study.

All interviews were recorded, coded and interpretatively analysed. A coding scheme was developed to analyse the interview data. This scheme was also used for a content analysis of the different school documents. The coding scheme contained coding areas referring to the conceptual framework of the study and the Flemish ICT policy context. In the first phase of the data analysis, all data from each school was brought together and a vertical analysis or within-case analysis (Miles & Huberman 1994) was applied. This led to the creation of a case-specific report which organizes and presents the interpretative data of each school in the same format using a fixed set of paragraphs. In the second data analytic phase, the results of the vertical analysis of each case study school were submitted to a horizontal analysis or cross-site analysis (Miles & Huberman 1994) in which the cases were systematically compared for similarities and differences.

During the two main stages of data analysis, the content of the within-case and cross-case analysis was discussed among the researchers to safeguard the quality of the interpretative data.

School selection

The three schools selected for this study used pICTos as a tool to support their process of ICT policy plan development in the context of a staff development programme. This programme was team-based and supervised by a professional trainer.

According to the Flemish situation, the three schools represent the different educational networks (see Table 2). None of the three schools had an ICT policy plan before starting the staff development programme. However, school A already had a short text describing the schools’ vision on ICT integration, and school B was collaborating with a teacher training institution to guide the school in the process of ICT planning. The schools also differed in terms of their satisfaction about the distribution of ICT related responsibilities between the school leader and the ICT coordinator, their existing ICT school equipment, their organization of ICT professional development activities, and the composition of the ICT steering group (see Table 2).

Results of the vertical analysis

The results of the vertical analysis of the three case study schools are presented around three themes. Next to a contextual description of the school, a distinction is
made between the developmental phase and the implementation phase of an ICT policy plan. The developmental phase refers to the five steps provided in the pICTos environment.

**School A**

**Context and profile**
School A is a large subsidized private school situated in an urbanized region of Flanders (see Table 2). The actual ICT use in the school is characterized by the school leader as a means of student differentiation, and to search for digital information by students. Before using pICTos, the school had no ICT policy plan, no ICT coordinator and no ICT steering group. Conversely, the school had a short text describing the schools’ vision on the place of ICT in education. According to the school leader, this text had not been distributed among the teaching staff, and teachers were not involved in the process of ICT vision development.
The school leader described the school as ‘an old ICT pioneer.’ This means that in the late 90s, the school served as an example to other schools in the region when it came to ICT integration. Nowadays, the school has out-of-date computer installations and teachers use ICT in their classroom practice in the same way as they did 10 years ago. Furthermore, in the past few years, the school has been confronted with problems regarding the search for and appointment of a suitable ICT coordinator.

The school leader saw the administration of the Flemish ICT curriculum as the ideal situation to attract a more pedagogically skilled ICT coordinator and to develop a school-based ICT policy plan based on a shared vision on ICT integration. During the pICTos staff development programme, the school leader introduced the newly appointed ICT coordinator to the teaching staff.

**Developmental phase**

Teachers in school A had a ‘dispersed’ vision on the nature of ‘good’ education (see Fig 2). Some teachers had strong transmissive beliefs, some had strong developmental beliefs, and others acknowledged both orientations. In establishing a vision on ICT integration, school A stressed that class-based instruction should precede pupils’ individual ICT use. The school emphasized that ICT is not an end in itself, but a means to attain other subject-related goals. Furthermore, the teachers in school A expressed a desire for a separate computer classroom as well as individual computers in each classroom.

The ICT activities currently performed in school A were particularly focused on the development of positive attitudes among pupils towards the use of ICT in education (AT1) and on ICT practice after class-based instruction (AT3). This coincides with the schools’ vision on ICT. The use of ICT as a communication tool (AT8) was the most underexposed AT.

The ICT ATs which needed more attention in future classroom practice were formulated for each teaching grade. In the lower grades, the school promoted the use of ICT within a teacher-centred vision on education, especially in mathematics and languages classes. For the higher grades, the school promoted the use of ICT within a student-centred vision on education (e.g. ICT as a presentation and communication tool).

In the curriculum planning phase, teachers registered new ICT activities. For school A, new ICT activities were drawn up around three categories: (1) the development of pupils’ basic ICT skills (e.g. how to save a file); (2) the use of specific software and instructional websites; and (3) large school-based ICT projects (e.g. information and communication exchange projects with other European schools).

In the formulation of concrete policy actions, school A decided which actions should be taken in order to successfully implement ICT in education and to realize the newly proposed ICT activities. The most important policy actions were (1) drawing up a more pedagogical mandate for the ICT coordinator; (2) re-allocating the school’s budget in order to update the hardware.

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**Fig 2 Educational beliefs at the school level (pICTos output Step 1).**
and software; (3) promoting an open-source software policy; (4) improving teachers’ basic ICT skills; and (5) establishing an ICT steering group. The school leader viewed the fifth action as the most important one and as the foundation of the school’s new ICT policy.

Implementation phase
After finishing the pICTos staff development programme, the team-based decisions of the five steps together with the input from the ICT coordinator in the administrative module served as a basis for the final ICT policy plan. The school leader planned to finalize the school’s policy plan within 1 year.

When interviewing school A 1 year later, all key actors argued that the school’s ICT policy plan was not finished because of the resignation of the ICT coordinator. Once more, school A had to appoint a new ICT coordinator which slowed down the process of policy plan development. The newly appointed ICT coordinator was given a clearly formulated mandate approved by the whole school team. The ICT coordinator had no technical responsibilities; his main tasks were pedagogical ICT teacher support, and the organization of ICT training and coaching.

Most of the formulated policy actions (see step 5) were put into practice by the school team. Special attention was paid to the establishment of the ICT steering group. The ICT steering group consisted of the school leader, the school’s ICT coordinator, ICT-minded teachers and parents with a professional background in IT business. The ICT steering group monitored the implementation of the school’s ICT policy, searched for new instructional websites and maintained the school computers. Next to this, the school formulated new ICT policy actions related to ICT professional development activities for teachers.

Looking back at the process of ICT policy plan development with pICTos, the school leader mainly appreciated the team-based process of policy planning. All teachers participated in this process and formulated technology goals and priorities for their classroom practice. The school leader also observed a change in ICT attitudes among the school teachers and noticed that teachers became more eager to integrate ICT in their classroom practices. This was confirmed by the results of the teacher questionnaire.

School B

Context and profile
School B is a small school situated in a medium-sized Flemish city (see Table 2). According to the school leader, the school emphasizes individual ICT use by pupils rather than ICT class-based instruction by teachers. Coping with social inequality is the school’s main policy rationale behind the promotion of ICT in education. School B started the process of ICT policy planning half a year before engaging in the pICTos staff development programme. This process was postponed by the school leader because of a conflict between the ICT coordinator and the school teachers concerning the future role of ICT in the school. According to the school leader, the visions of the ICT coordinator and the teachers were diametrically opposed to each other. While the ICT coordinator was in favour of more isolated technical computer lessons, the school teachers emphasized a more integrated approach towards ICT within the different school subjects. The school leader hoped pICTos would help the school in identifying a clear vision on ICT integration.

The school had a well-organized ICT steering group, mainly consisting of parents. The ICT steering group was responsible for the maintenance of the school computer equipment and the server installation. The more pedagogically oriented ICT tasks were assigned to what the school calls the ‘ICT teacher’. Different from the ICT coordinator appointed by the educational network, the ‘ICT teacher’ is a member of the school team and appointed by the school.

Developmental phase
The teachers in school B had a homogenous vision on the nature of ‘good’ education. Almost all teachers had high scores for developmental beliefs and low scores for transmissive beliefs (see Fig 2). Consequently, the school’s vision on the nature of ‘good’ education was characterized by experiential education, promoting pupils’ individuality and creativity (e.g. using ICT when redacting articles for the school journal). Within this context, school B’s vision on ICT integration was further delineated: the school underlined that ICT should always be considered as a means of achieving other teaching objectives. This school also emphasized that students are competent and responsible enough to work independently with a computer. Based on these
visions, school B decided to abolish the school computer classroom and to distribute the computers among the different classroom teachers. The ICT coordinator was dissatisfied with this decision.

While exploring the actual ICT use in school B, the school team discovered that the ICT activities performed have a particular focus on the development of positive attitudes among students towards the use of ICT in education (AT1) and on the use of ICT to increase pupils’ creativity (AT5). These ATs are in line with the school’s vision on ICT integration.

The ICT ATs prioritized by school B are based on the school’s vision on ICT integration and the actual use of ICT. School B had chosen three specific ICT ATs (AT3, AT4 and AT5; see Table 1) that need more attention in classroom practices. The school made no distinction between teaching grades. In this sense, the ATs referring to pupils’ independent learning and creativity are prioritized for all students in school B.

In the curriculum planning phase, newly proposed ICT activities for students referred to both the development of pupils’ basic ICT skills and to the prioritized ICT ATs (autonomy and creativity). In this context, school B aimed to design a new school website containing classroom blogs. School B also aimed to establish a collaborative project with a teacher training institute. Based on the school’s vision on ICT and on the prioritized ATs, student teachers from this institute aimed to formulate innovative ICT activities using web 2.0 applications.

The ICT policy actions formulated by school B clearly referred to the previous curriculum planning phase: (1) improving pupils’ basic ICT skills; (2) exploring web 2.0 applications in the context of a collaboration project with student teachers; (3) purchasing laptops which are more flexible to use by pupils; and (4) new appointments concerning the distribution of tasks between the ICT coordinator, the ICT teacher and the school leader. This last policy action refers to the persistent conflict with the school’s ICT coordinator.

Implementation phase
One year later, school B presented its ICT policy plan. The school leader argued that the process of developing this document over the year was more important than its original compilation. Therefore, the school’s ICT policy plan was a rather short text (four pages) containing no more than its vision on ICT integration and some basic points on how to implement the ICT curriculum. ICT policy planning was described by the school leader as an ‘organic process’ referring to the informal, ongoing and collaborative character of policy planning in the school.

In the year after the pICTos staff development programme, school B realized almost all the formulated policy actions. For instance, the collaboration project with the student teachers was successful and resulted in new ICT activities in the classrooms of the higher grades (e.g. classroom weblogs).

With regards to the conflict between the school’s ICT coordinator and the school team, the collective process of ICT policy planning made the existing conflict more explicit, and some months after the school worked with the pICTos-programme the ICT coordinator resigns. Following this, the school leader used the pICTos results to formulate a job description and to appoint a new ICT coordinator.

Looking back at the process of ICT policy planning, the school particularly appreciated the data-driven decision-making characteristic of pICTos. According to the school leader and the ICT teacher, pICTos produced a dynamic process in the school whereby ICT integration became a concern of all school teachers. The school considered abolishing the ICT steering group and redistributing their tasks to the school team members.

School C

Context and profile
School C is a small community school located in a small Flemish city. According to the school leader, the main characteristics of the school include the young age of the school team members and its well-equipped ICT infrastructure (e.g. broadband and wireless internet connections, digital cameras, and interactive whiteboards). The school had appointed two ICT coordinators with different responsibilities: one with a technical job description and the other with more pedagogically oriented tasks. Both ICT coordinators met weekly and form the ICT steering group of the school (see Table 2).

The training of students in technical ICT skills was described by the school leader as typical for the current ICT use in the school. The school had no ICT policy plan and no vision on ICT integration. The ICT coordinators stressed that the school invested in a qualitative
The inventory of currently performed ICT activities linked to the Flemish ICT ATs fits within the school’s vision on education and ICT integration. The school paid attention to ICT ATs (see Table 1) that are situated within both a teacher-centred vision on education (e.g. AT3) and a student-centred vision on education (e.g. AT4 and AT6). ATs referring to the creative and communicative processes of students were underexposed in school C.

School C prioritized all eight ICT ATs according to students’ age. The attitudinal ATs (AT1, AT2) were prioritized for students between the age of 6 and 8, the ATs concerning individual work and learning (AT3, AT4, AT6) were prioritized for students between the age of 9 and 10, and the creative and communicative targets (AT5, AT7, AT8) were prioritized for students between the age of 11 and 12. According to the school, the priorities reflect a transition from working on students’ attitudes towards ICT activities within a teacher-centred perspective, to supporting students’ individual and autonomous ICT activities.

When thinking of future ICT curriculum activities, teachers in school C wanted to use ICT as a remedy tool; educational software and web quests should be the main ICT activities for the 9–10 year-olds; and for the 11–12 year-olds the school’s website should be used to communicate with the broader school community. This is also an explicit element of the school’s vision on education.

The concrete policy actions of school C were formulated in a twofold way. First, school C identified a list of school specific barriers that it faced when integrating ICT in education (e.g. ICT knowledge of teachers). Subsequently, school C outlined strategies to overcome these barriers: (1) promoting ICT in-service teacher training courses and ICT professional development; (2) searching for new instructional software and websites; (3) an expansion of the ICT steering group with teachers; and (4) providing more information to teachers on the existing ICT school equipment.

The concrete policy actions of school C were formulated in a twofold way. First, school C identified a list of school specific barriers that it faced when integrating ICT in education (e.g. ICT knowledge of teachers). Subsequently, school C outlined strategies to overcome these barriers: (1) promoting ICT in-service teacher training courses and ICT professional development; (2) searching for new instructional software and websites; (3) an expansion of the ICT steering group with teachers; and (4) providing more information to teachers on the existing ICT school equipment.

Implementation phase

In the year following the pICTos staff development programme, both the school leader and the ICT coordinators of school C resigned. The school leader and technical ICT coordinator were promoted and the pedagogical ICT coordinator left the country for a developing co-operation project. The school appointed a new school leader and one new ICT coordinator (with a technical and pedagogical job description). Both employees were very experienced and identified ICT integration as the school’s number one priority. This means that the establishment of a school-based ICT policy plan was their first task after being appointed.

One year after the staff development programme, school C presented its ICT policy plan. The policy plan was a large document of more than 100 pages containing different sections, including the school’s vision, a description of the school’s hardware and software, an ICT code of behaviour for students and teachers, ICT policy actions, etc. The policy plan also contained a detailed description of all planned ICT activities per class. These activities are described as concrete and observable teaching and learning activities so that the school can monitor the process of ICT implementation. The school’s ICT policy plan was compiled by the new school leader and ICT coordinator making use of all information stored in the pICTos environment. According to both compilers, pICTos made knowledge transfer on ICT easy and straightforward. They hoped that the
inspectorate would appreciate their ICT policy planning efforts.

The strategies formulated by the school teachers during the developmental phase are not yet put into practice, but are included in the school’s ICT policy plan.

Results of the horizontal analysis and discussion

Vision on ‘good’ education

The first step in the pICTos environment offers schools the opportunity to formulate a team-based vision on the nature of ‘good’ education in relation to ICT integration. This is emphasized in the literature as a crucial condition for successful ICT planning: an ICT policy plan should be grounded in a vision on education. Schools then question their core philosophies of learning and instruction and identify how ICT can support this vision (Fishman & Zhang 2003; van Braak 2003; Vanderlinde et al. 2008). Without such a vision, teachers are prone to limit their thinking about ICT to ‘boxes and wires’ or isolated computer skills (Fishman & Pinkard 2001). The results of this study illustrate that school teams are able to formulate a vision on ‘good’ education in relation to ICT integration. In all three case study schools, the future place of ICT is grounded in a shared vision on ‘good’ education. For instance, while school A stressed that class-based instruction needs to precede pupils’ individual ICT use, school B emphasized that pupils should use ICT for independent and creative work. In this way, ICT use is more teacher-centred in school A, and more pupil-centred in school B. The case studies also illustrate that a shared vision on education influences all decisions made by the schools in the subsequent steps of ICT policy planning. In other words, an elaborated vision on the nature of ‘good’ education affects which ICT ATs will be prioritized, how new ICT activities will be implemented in the curriculum, and which concrete policy actions need to be taken.

Data-driven decision-making and sustainability

The results of this study illustrate how schools are making use of specific data to shape policy and practice, which has recently become a point of interest in ICT integration research (Vanderlinde et al. 2010). The case studies demonstrate how individual teacher data is gathered and analysed, so that team-based decisions can be made. In the three schools, decisions were made on topics such as the place of ICT in the classrooms, the job description of the ICT coordinator, and the management of the school’s ICT infrastructure. The case studies also reveal that in each school the process of policy planning resulted in a real policy document, but that there is a difference in ‘the nature’ of this document. School A produced a draft version of an ICT policy plan, school B developed a short ICT vision text and school C presented a bulky document of more than 100 pages. This illustrates that the actual plan that is developed is of less importance than the underlying processes, and that schools establish an ICT policy document based on their particular vision and context.

This study shows that it is important to store all data electronically. In school C the process of policy plan development was not postponed when the school leader and the ICT coordinators resigned. Because all school data and previously made decisions were saved in the pICTos environment, the newly appointed school leader and ICT coordinator could use this information to finalize the school’s ICT policy plan. The results of the follow-up phase of this study indicate that all schools struggled with the sustainability of their ICT policy plan. For example, although school A had already formulated new ICT policy actions, the school had no idea how to further monitor the process of policy plan implementation. In contrast to school A, sustainability was not even being discussed in school B and school C, although school C had intended to monitor the process of policy plan development. Such monitoring would have been possible in school C because teaching and learning activities were formulated in observable terms. This finding puts into question the ongoing nature of ICT policy planning (Fishman & Zhang 2003) with regard to its continuous improvement and revision (Gulbahar 2007). Just as schools need support in the process of policy plan development, they also need assistance in the process of policy plan revision. Moreover, schools should think about how to monitor the implementanation process.

Supporting conditions: infrastructure, competencies and leadership

The policy actions formulated by all schools are similar to the conditions described in the literature as supporting the integration of ICT in teaching and learning (e.g.
Hew & Brush 2007). All schools pay attention to issues of infrastructure, competencies and leadership (see also Dale et al. 2004), but differ in the way these conditions are contextualized and translated into practice.

The first condition put forward by the three schools is ICT infrastructure. This condition is considered as the most notorious impediment to ICT integration (Pelgrum 2001). In this study, the implementation of an ICT curriculum and the development of an ICT policy plan are strongly related to improving the existing ICT infrastructure. Both hardware (e.g. purchasing laptops in school B) and software issues (e.g. the promotion of open-source software in school A, and web 2.0 applications in school B) are at stake. In all schools, decisions on the ICT infrastructure are more or less based on the school’s vision on education and ICT integration (see Fig 2). This is clearly visible in school B which decided to abolish the school computer classroom.

Another condition that is acknowledged by all three schools refers to the improvement of ICT competencies (see Hew & Brush 2007). Both pupils and teachers should develop ‘basic ICT literacy’, and all schools plan to organize ICT professional development activities to improve ICT competencies. Interesting in this context is the collaboration project of school B with a teacher training institute. For instance, teachers in this school learned from the student teachers how to use a classroom blog in their daily practice.

The third condition put forward by all schools is related to aspects of ICT leadership. All schools pay explicit attention to how the process of policy plan implementation is best managed, but differ in the way this is contextualized and translated into practice. For instance, while school A decided to establish an ICT steering group consisting of teachers and parents, school B decided to abolish this ICT steering group. In school C, ICT leadership issues are distributed among the ICT steering group, the ICT coordinator, and the school leader. This study illustrates that there is no standard ICT leadership structure or solution, and that ICT leadership is best considered as a school-wide characteristic instead of associating it with a particular leadership role (see also Dexter 2009). This study also shows that in all case study schools the job description of the ICT coordinator changed, and that new appointments were made concerning the assignment of tasks between the ICT coordinator, the school leader, the ICT steering group and the classroom teachers.

Team-based learning

In this study, ICT policy planning is seen as a collaborative process. This strategy of policy planning implies the encouragement of teacher participation in the process of decision making. This is a crucial condition for the implementation of educational change and is important for the integration of ICT in education (Katz & Williams 2002). In the three case studies, school teams learned about the actual and future place of ICT in teaching and learning. In step 4 team learning was structured around collaborative curriculum development, and in step 5 team learning was structured around policy decision making. As such, in this study learning processes are situated on the school team level. Similar to the case study research of Dexter et al. (2002), the schools discussed in this study became learning organizations and evolved into professional communities. The three school teams explored and re-thought teaching and learning with ICT (see Triggs & John 2004). Following Dexter et al. (2002), we argue that pICTos as an ICT environment is reciprocal or mutually supportive for local ICT policy planning. The online tool (pICTos) has made local ICT policy planning easier and more explicit, and the process of ICT policy planning has facilitated teachers’ ICT attitudes and ICT curriculum practices. In other words, ICT itself has been used to support the process of ICT policy planning (see also Tondeur et al. 2009).

Conclusion

This study illustrates how schools shape their ICT policy plan and how they made use of an online supporting tool in this process. During the process of policy plan development, decisions were based on specific school data and teachers were fully involved. School teams learned about the actual and future place of ICT in teaching and learning, and policy decisions were made according to the school’s vision on ‘good’ education and ICT integration. This means that the shared vision on ‘good’ education served as the foundation for a school-based ICT policy plan, and affected all other curriculum and policy planning initiatives.

This study adds to the literature in several respects. The study provides information about the processes of ICT planning in schools and fills a gap in the literature about ICT planning. In addition to the more general
literature on ICT planning, this study describes the ICT planning process in-depth. The case studies demonstrate how three different schools arranged their school-based ICT policy planning process. Furthermore, the results of this study may be of interest to school leaders and ICT coordinators who want to start up processes of ICT policy planning in their own schools. The decisions made by the three case study schools concerning the development and the content of their school-based ICT policy plan can be inspiring for other schools.

In addition, the results of the case studies are of particular interest for future tool developers, as this study gains insight into the role of online supporting tools in the process of ICT policy planning. When developing new online tools or revising existing ones (e.g. the ‘Four in Balance’ tool in the Netherlands or Becta’s ‘Self-review framework’ in the United Kingdom), tool developers can consult the design principles, the steps of the cyclic process, and the structure of the pICTos environment. For the context of Flanders, the results presented in this study have been used in a broader evaluation research project leading to a redesign of the pICTos environment.

The present study specifically focuses on school teams and examines the underlying processes of ICT planning. More research is needed in this domain. Aside from our process oriented research questions, future research should tackle questions concerning effectiveness (see also Vanderlinde et al. 2009). Further research should explore how ICT planning affects the ICT use of teachers and pupils in their daily classroom practice. Such research then relates ICT planning at the meso or school level to ICT planning at the micro or classroom level.

References


