MICTIVO: Monitoring ICT integration in Flemish Education. Theoretical background and set-up

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Abstract
Parallel with ICT-investments, governments set-up monitoring programs to evaluate the return on investment and effects of ICT on educational practice. MICTIVO aims to monitor the ICT-integration in the Flemish education system. ICT-integration in MICTIVO is a combination of ICT-infrastructure, ICT-policy and ICT-use at the micro-level, in which three actors are involved: headmasters, teachers and students with their characteristics, ICT-competences and perceptions towards ICT. MICTIVO is devised as a recurrent instrument with room for additional indicators to assess the latest trends (e.g. social media use). During the first edition (2007-2008), scales were validated and empirically tested, and the second edition (2012-2013) is a follow-up study. Design principles were ensuring comparability (over time, between actors, between indicators) and avoiding redundancy. To get a representative view on the Flemish education system, 20% of the schools are selected through stratified random sampling. The selected schools are allocated to one of three sub studies. In the first, only headmasters are questioned (80% of the sample), in the second also all the teachers per school (10%) and in the third also several classes of students per school (10%). This will allow to run multilevel analyses. The strengths of MICTIVO are that we will get a representative view on the status of ICT-integration in Flanders, based on scales that were validated in the population and with strong psychometric properties.

Introduction / Rationale

In the past decades, a lot of money has been invested worldwide in the introduction and integration of Information and Communication Technologies (ICT) in education. ICT covers a range of digital technologies through which people can retrieve, process, transfer and generate information or communicate with other people. Together with the investments, monitoring programs have been setup to gain insight into the "return on investment" and effects of ICT on educational practices.

Monitoring ICT integration

Also in Flanders (the Dutch-speaking part of Belgium), the Flemish government issued a call for monitoring ICT integration, this resulted in MICTIVO (Monitor ICT-Integratie in het Vlaamse Onderwijs). MICTIVO is conceived as a recurrent monitor with space for additional ICT-related indicators to be able to measure the latest innovations (e.g. social media usage). During the first edition (2007-2008), the monitor was conceived and validated (Evers, Sinnaeve, Clarebout, van Braak, & Elen, 2009), and during the current school year, the monitor is taken a second time (MICTIVO2).

ICT integration can be regarded from different viewpoints, all of which are taken into account in MICTIVO: (a) policy oriented: to assess the efficacy of an ICT-policy or to determine the content and direction of future ICT-policies, see for example the "ICT in Schools Survey" (ICTSS) (Plante & Beattie, 2004); (b) technologically oriented: assessing the impact and effects of specific technologies, see for example the ImpaCT2-study (Harrison, Lunzer, Tymms, Fitz-Gibbon, & Restorick, 2004); and (c) educationally oriented: to what extent does ICT integration result in methodical and content-related adaptations in education, e.g. Smeets (2005). For MICTIVO, ICT integration is conceived as depicted in Figure 1, made up of three parts: ICT-infrastructure, ICT-

policy and ICT-use at the micro-level. The competences, characteristics and perceptions of three actors are taken into account: students, teachers and ICT-policy makers (the headmaster and/or ICT-coordinator). In MICTIVO1, 17 indicators were developed to measure these components. Only the 14 psychometrically sound indicators were withheld for the current monitor, and four new indicators were added (see Table 1).

While devising MICTIVO1 & 2, the following principles were adhered to: (1) ensuring comparability over time: the same items are used in MICTIVO1 & 2; (2) ensuring comparability between actors: semantically equal items are used to measure one indicator in different actors; (3) ensuring comparability between indicators; and (4) avoiding redundancy: information that can be acquired directly through a different source is not asked to the headmaster or ICT-coordinator.

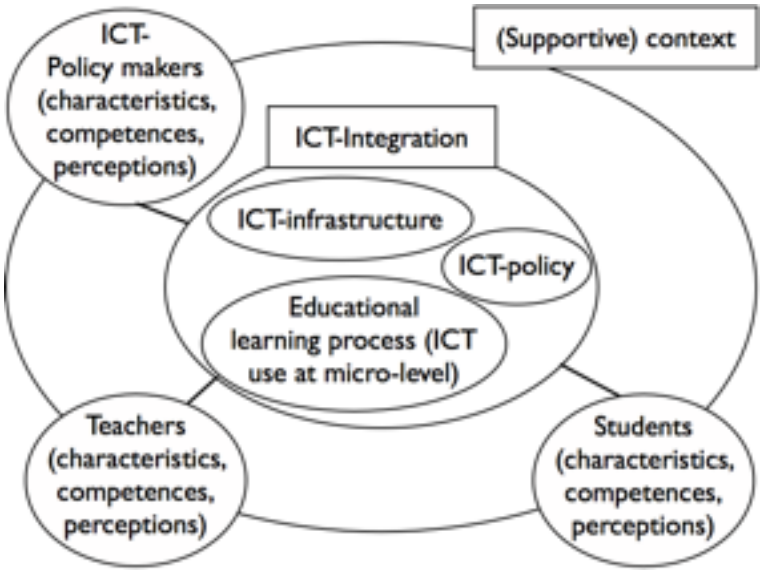

Figure 1. MICTIVO-model (Evers, Sinnaeve, Clarebout, van Braak, & Elen, 2009)

Component *Indicator*	Head-master	Teacher	Student
ICT-infrastructure and ICT-policy			
Availability of hardware	X	-	-
Availability of Software	X	-	-
ICT-policy	X	X	-
ICT-competences			
Computer attitudes	-	X	X
Pedagogical-Didactical competences of teachers	X	X	-
ICT-competences of students	-	X	X
Computer experience	X	X	X
ICT-integration			
ICT-use by teachers	X	X	-
ICT-use by students	-	X	X
ICT-perceptions			
Perceptions on the importance of ICT for education	X	X	-
Perceptions on the effects of ICT-use	X	X	X
Perceptions on the ICT-infrastructure	X	X	-
Perceptions on the ICT-policy	X	X	-
Perceptions on ICT-training	X	X	-
New indicators			
Media literacy	-	X	X
Social media use	-	X	X
Use of digital games	-	X	X
ICT-related professionalization	X	X	-

Table 1. Indicators per component and actor. The new indicators are introduced in MICTIVO2

Sampling and selection of schools

To ensure representativity, one fifth of all primary and secondary schools (including special education at both levels) are targeted, and all centers for adult basic education. Institutions that participated in MICTIVO1 could not be selected, this does not hold for the adult basic education centers. Schools are selected based on their administrative number through stratified sampling. Stratification occured on the basis of three parameters: school size (large, medium, small), province (the five Flemish provinces), and educational network (community, official subsidised, and free subsidised education). Table 2 provides an overview of the sampling frame. As it is not possible to question all actors in all schools, schools are allocated to one of the three substudies, see Figure 2. Headmasters are always questioned, teachers only in studies 2 and 3, whereas students only in study 3. To account for non-response, three lists per study per sample were drawn.

	Primary education		Secondary Education		Adult Basic Education
	Normal	Special	Normal	Special	
Population	2335	190	968	108	13
MICTIVO1	456	36	169	21	13
MICTIVO2	466	39	194	21	13
Study 1	368	28	154	16	-
Study 2	49	11	20	5	13
Study 3	49	-	20	-	-

Table 2. Sampling frame.

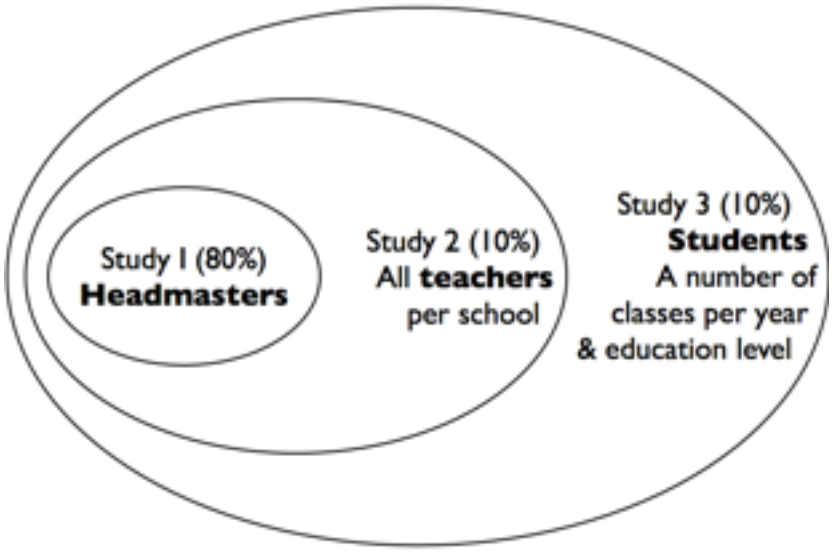

Figure 2. Substudies in MICTIVO2

Procedure and data collection

All questionnaires are developed using Qualtrics software. The data collection procedure depends upon the study and the actor: all headmasters receive a letter from the Flemish Minister of Education, together with a letter from the researchers. Schools in studies 2 and 3 are then

contacted per phone by one of the researchers to confirm their participation and collect the email addresses of the teachers. Headmasters and teachers are invited per e-mail to fill in the questionnaire. Students - starting from the fifth year (about 10 years of age) in primary education - are questioned in the classroom under supervision of a researcher.

Theoretical significance

For this study, ICT integration is studied from different viewpoints. Hereto we draw on scales with solid psychometric qualities that were validated in the same population (the Flemish education system). Moreover, by applying stratified random sampling, this study will allow us to draw conclusions on the status of ICT-integration in the Flemish education system. By selecting different actors (and large samples of teachers and students) per institution (Studies 2 and 3), we will be able to run multilevel analyses.

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