Teacher Collaboration Concerning ICT-Use and its Essential Conditions

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Abstract: The paper presents selected findings from the German follow-up study (2006-2007) of the IEA-Study Second Information Technology in Education Study, Module 2 (SITES-M2), funded by the German Research Foundation. It is a qualitative and quantitative study based on eleven case studies and was conducted five years after the data collection in SITES-M2 (1999-2002). It identifies supportive and obstructive conditions for intra-school teacher collaboration. One of the main results is a conceptual anchoring of the collaboration. The findings show that the collaboration has to be supported on all levels of the school to become operational, such as the context-, input- and process level. Furthermore, a scale-indicator to measure ICT-related teacher collaboration has been developed.

Keywords: Teacher, Teamwork, Research, Case Studies, Classroom Teaching/Practice

1. Introduction

In general, teacher collaboration is regarded as important to school development and school improvement research. National and international studies indicate that teacher cooperation is an essential supporting condition for a successful integration of ICT in schools. The findings emphasize the necessity of a strong culture for professional collaboration (Dexter, Seashore, & Anderson, 2002; Schulz-Zander, Büchter, & Dalmer, 2002; Kelchtermans, 2006; Law, & Chow, 2008). The main goals of teacher cooperation regarding ICT-use for teaching and learning are: to develop visions; to connect the use of ICT with pedagogical goals; to co-construct didactical knowledge; to develop and exchange learning materials; and to establish a teacher commitment to integrate ICT into classroom practice. The building of Communities of Practice (COP) enables teachers to prepare themselves for twenty-first-century skills and competencies. It is a strong contributor to
their professional development (Looi, Lim, & Chen, 2009). Studies show that the continuity and success of the composition of teachers’ learning communities regarding ICT cannot be forced ‘top down’ and are only established sustainably in democratic processes (Krumsvik, 2005; Shapley et al., 2006). Nevertheless, the dynamic of the development of new ICT applications and devices which claim to cultivate a continuous and flexible collaboration seems to be hard to establish in schools over a longer period of time. The research questions in this paper therefore are: What conditions are contributing to successful ICT-centered teacher collaboration and how do teachers estimate its impact on their own professional development? This paper proposes the essential and contributing predictors of successful teacher collaboration in the context of ICT-use in schools on an empirical basis. Furthermore, it provides a scale consisting of five items to measure teacher collaboration related to ICT. All findings presented in this paper are generated from a cross-case-analysis of a German follow-up study (2006-2007) of the Second Information Technology in Education Study, Module 2 (SITES-M2, 1999-2002) funded by the German Research Foundation.

2. Method and data-analysis

The scope of our research is provided by a German follow-up study of SITES-M2 (Schulz-Zander, & Eickelmann, 2008). It is a qualitative and quantitative study based on case studies and was conducted five years after the data collection in SITES-M2. The sample consists of eleven of the twelve German SITES-M2-schools, as one school was closed in the intervening period. The schools were chosen according to international criteria. With regard to the use and integration of ICT, they were among the leading schools in Germany in the year 2000. Thus, the follow-up study adopts the methodological approach of the SITES-M2 and adds student and teacher questionnaires. The main test consisted of three elements: (1) qualitative interviews with a subsample of teachers and students, principals and IT-coordinators, (2) questionnaires addressed to the principal, the IT-coordinator, all teachers of the participating schools and all students of Grade 4, 10 and 12, (3) analysis of school programs, media and ICT concepts of the schools, and the narrative reports drawn from the SITES-M2. A pre-test was carried out to field test the validity of newly-developed and adopted instruments. In total, 680 teachers and 930 students were addressed. This approach allows for collecting rich data concerning ICT and school improvement and development. In the sense of data and method triangulation, findings from the quantitative survey were ensured with qualitative data and vice versa. The focus of the cross-case-analysis concerning aspects of teacher collaboration presented with this paper are content analysis of the qualitative interviews with teachers, IT-coordinators and principals complemented by statistical analysis of the questionnaire data. The quantitative data were statistically analyzed predominantly by each case.
3. Outcomes

Simple forms of cooperation between teachers in connection with ICT – for example, the exchange of material and information – were often described by the teachers. They hardly mentioned elaborated forms of cooperation such as collaborative learning or professional learning communities. Hence, teachers stated that ICT is strengthening existing cooperation, and facilitates the exchange of material as well as the communication.

Our empirical analysis of school development processes in the context of ICT allows us to identify supportive and obstructive conditions for intra-school teacher collaboration (Eickelmann, & Schulz-Zander, 2008).

Hindering conditions: On the context level, the lack of sponsoring and the withdrawal of the public-private-partnership as well as the discontinuation of support programs were named as hindering factors. On the input level, according to the teachers, the development of cooperation is hampered especially by the following factors: large workload; limited material resources (access to technology, equipment in the classrooms); lack of time, e. g. to maintain cooperation and to execute in-school advanced teacher training courses; and also teacher variables, e. g. lack of acceptance of ICT, insufficient IT-competence and pedagogical competence to use ICT. On the process level, the general decrease of cooperation development among the teaching staff was pointed out. In some cases, the quality of cooperation with the school district and the school supervisory board was cited as hindering factors.

Supporting factors: The external financial support and cooperation with external partners are supporting factors for the cooperation development related to ICT-use. On the input and process levels, the following factors encourage the development of cooperation regarding ICT: in-service teacher training outside and within the school, also as an impulse for ICT-related cooperation and as a motivation for teachers; individual factors, especially the willingness of teachers to improve their ICT-skills and didactic knowledge; organizational support from the school district; improvement of the climate of cooperation among the teaching staff, as it contributes to the willingness to participate in teacher training courses; in-school initiated cooperation with external partners, e. g. schools from other countries or schools in networks; supportive principal and school management related to ICT to enhance professional development, cooperation and networking. A supportive school culture increases the willingness to cooperate and to participate in joint projects under use of ICT.

In addition, we developed a scale, consisting of five items, to measure ICT-related teacher collaboration (cf. Tab. 1). The scale derived from newly developed items exhibits good reliability with Cronbach’s Alpha = .83.
Table 1. Scale “ICT-related teacher collaboration”

<table>
<thead>
<tr>
<th>Statistics</th>
<th>N = 182</th>
<th>AM = 2,10</th>
<th>SD = 0.76</th>
</tr>
</thead>
<tbody>
<tr>
<td>α = 0.83</td>
<td>MIN = 1.00</td>
<td>MAX = 5.00</td>
<td></td>
</tr>
<tr>
<td>Question</td>
<td>How often do you work regularly on the following topics or tasks with other teachers in your school?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Items</td>
<td>Item</td>
<td>AM</td>
<td>SD</td>
</tr>
<tr>
<td>1</td>
<td>Development of teaching materials for use of ICT in class</td>
<td>1.90</td>
<td>.99</td>
</tr>
<tr>
<td>2</td>
<td>Providing information and materials via the school intranet</td>
<td>1.56</td>
<td>.86</td>
</tr>
<tr>
<td>3</td>
<td>ICT-equipment in the school</td>
<td>2.47</td>
<td>1.02</td>
</tr>
<tr>
<td>4</td>
<td>Use of ICT in class</td>
<td>2.52</td>
<td>1.08</td>
</tr>
<tr>
<td>5</td>
<td>Teaching concepts for ICT-use</td>
<td>2.11</td>
<td>.99</td>
</tr>
</tbody>
</table>

Considering the individual items in the scale, it is clear that the use of ICT in class and the ICT-equipment proved to be a topic of teacher cooperation in our random samples more often than the development of teaching concepts and teaching materials. Providing information and materials via the internet, in this connection, does not yet play a role for the teachers. However, the interest in this type of cooperation does exist: one third of the primary school teachers use the school intranet for collaboration purposes. The teachers, however, see no basic change in cooperation in their school through the integration of ICT in the teaching and learning context. In primary as well as in secondary schools, the teachers state that their cooperation with one another, with outside people and teachers from other schools has not improved through the use of computers. However, one third of the teachers positively assess the potential to involve external experts in the learning process by the use of ICT. The participants agree that the reasons for the stagnating or declining of collaborations are not due to decreasing relevance of the subject.

4. Conclusions

The design of the SITES-follow-up-study was based on case studies. Therefore the conclusions do not allow far-reaching claims on teacher collaboration concerning ICT as such propositions would not be statistically sound.

One of the main results is a conceptual anchoring of the collaboration, e. g. in school programs, contributes to supporting teacher collaboration and fosters to the implementation of new IT developments. Furthermore, former results are reconfirmed: it becomes obvious, that the collaboration has to be supported on all levels to become operational, such as the context-, input- and process levels.
The analyses show that the way in which teacher collaboration is practiced with respect to ICT is not perceived to significantly differ from other types of collaboration. The most commonly found forms of teacher collaboration relate especially to the ICT-use in the classroom, to the technical equipment as well as to the exchange of information and materials. Other aspects, such as the development of materials for ICT-use in the classroom, the collaborative development of lesson plans and the exchange of materials via the intranet, play much less of a role. For this reason, collaboration has to be supported on the context-, input- and process levels in order to be operational in terms of school effectiveness. It also becomes clear that IT in the form of email communication and the exchange of information and materials has increased collaboration among the teaching staff. Networking, interactivity and multimedia as special features of ICT can change not only methods of learning but also the way teachers collaborate. Through new technological developments, the variety of opportunities will continue to increase. It remains to be seen which of them will be used by teachers.

References