

## Digitalized Education and Personalized Learning



[https://unsplash.com/collections/144661/surf-views?photo=MqJX\\_8EaStM](https://unsplash.com/collections/144661/surf-views?photo=MqJX_8EaStM)

Dominik Petko, ASEM LLL Hub & ASEF ClassNet Conference, 10.09.2017 in Zug

### The future of school from the point of view of children

(Laura & Alana, 2. Klasse)

In the future, the teacher will stay at home in the bathtub and have a relaxing glass of champagne. Then the teacher will press a red button that turns on a robot, which then chases the naughty children. Then she will press another button and the robot will teach everyone. Later, the teacher would talk to the kids in her classroom through a microphone."

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## The Telegraph

HOME » TECHNOLOGY

### Robot teacher conducts first class in Tokyo school

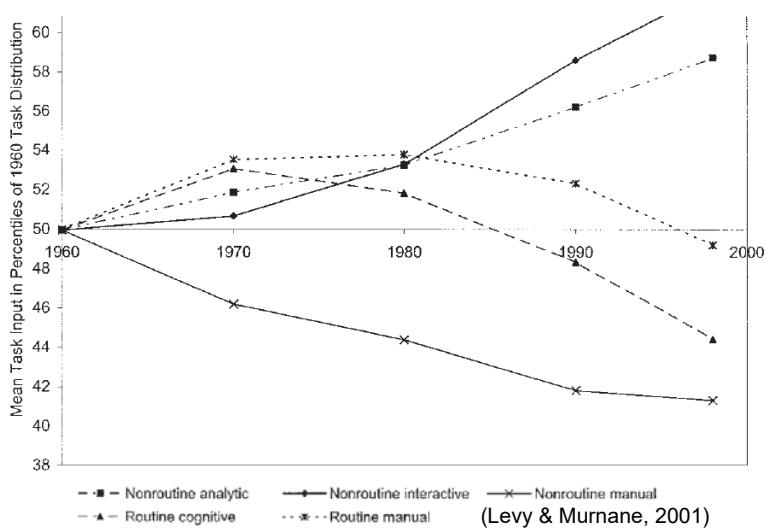
A robot schoolteacher developed by Japanese scientists has taken a class in a Tokyo school.

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## Vocational competence requirements in transition

Computerizable		
Rank	Probability	Occupation
1.	0.0028	Recreational Therapists
2.	0.003	First-Line Supervisors of Mechanics, Installers, and Repairers
3.	0.003	Emergency Management Directors
4.	0.0031	Mental Health and Substance Abuse Social Workers
5.	0.0033	Audiologists
6.	0.0035	Occupational Therapists
7.	0.0035	Orthotists and Prosthetists
8.	0.0035	Healthcare Social Workers
9.	0.0036	Oral and Maxillofacial Surgeons
10.	0.0036	First-Line Supervisors of Fire Fighting and Prevention Workers
11.	0.0039	Dietitians and Nutritionists
12.	0.0039	Lodging Managers
13.	0.004	Choreographers
14.	0.0041	Sales Engineers
15.	0.0042	Physicians and Surgeons
16.	0.0042	Instructional Coordinators
17.	0.0043	Psychologists, All Other
18.	0.0044	First-Line Supervisors of Police and Detectives
19.	0.0044	Dentists, General
20.	0.0044	Elementary School Teachers, Except Special Education



(Frey & Osborne, 2013)

(Levy & Murnane, 2001)

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## New educational affordances in schools

(Anderson, 2008)

Demands from society	Required skills	Learning strategies
Knowledge as commodity	Knowledge construction	Inquiry, project learning, constructivism
Rapid change, renewal	Adaptability	Learning to relearn, on-demand learning
Information explosion	Finding, organizing, retrieving information; ICT usage	Multidatabase browsing exercises
Poorly organized information	Information management, ICT utilization	Database design and implementation
Incompletely evaluated information	Critical thinking	Evaluation problem solving
Collectivization of knowledge	Teamwork	Collaborative learning

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## Use of digital technologies in Swiss schools?

**PISA 2000** Schülerinnen- und Schülerfragebogen

	fast jeden Tag	Mehrmals pro Woche	höchstens einmal pro Woche	nie
Dänemark	23%	37%	37%	3%
GB	18%	39%	32%	12%
Kanada	18%	21%	45%	16%
Neuseeland	18%	16%	48%	17%
USA	17%	19%	47%	16%
Schweden	16%	29%	44%	11%
Australien	15%	35%	42%	8%
Luxemburg	8%	28%	48%	17%
Mexiko	7%	26%	14%	53%
Ungarn	7%	59%	24%	10%
Finnland	6%	42%	46%	6%
Lettland	5%	36%	38%	21%
Liechtenst.	5%	24%	62%	10%
Norwegen	5%	23%	62%	11%
Irland	4%	22%	39%	35%
<b>Schweiz</b>	<b>4%</b>	<b>17%</b>	<b>57%</b>	<b>21%</b>
Tschechien	3%	25%	46%	27%
Belgien	3%	26%	45%	26%
Brasilien	3%	5%	27%	65%
Deutschland	3%	13%	46%	38%
Russland	2%	23%	35%	41%

**ICILS 2013** Schülerinnen- und Schülerfragebogen

	jeden Tag	min. 1x pro Woche	min. 1x pro Monat	weniger	nie
Australien	33%	47%	14%	5%	1%
Polen	1%	78%	8%	5%	7%
Slowakei	3%	73%	14%	7%	2%
Dänemark	33%	43%	19%	4%	1%
Russland	8%	65%	12%	8%	7%
Thailand	4%	62%	17%	12%	5%
Niederlande	13%	50%	23%	12%	2%
Kroatien	2%	60%	8%	8%	22%
Tschech. Rep.	2%	58%	22%	13%	4%
Canada (Ont.)	10%	49%	29%	11%	1%
Hong Kong	3%	55%	25%	13%	5%
Argentinien /BA	11%	46%	10%	10%	23%
Litauen	2%	53%	16%	18%	11%
Canada (Newf.)	6%	48%	33%	12%	1%
Norwegen	8%	44%	38%	9%	1%
Türkei	3%	32%	10%	17%	39%
<b>Switzerland</b>	<b>1%</b>	<b>34%</b>	<b>33%</b>	<b>28%</b>	<b>5%</b>
Chile	2%	32%	27%	27%	11%
Deutschland	2%	30%	24%	35%	10%
Slovenien	1%	25%	30%	37%	7%
Rep. Korea	3%	15%	12%	39%	30%

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## **Everything stays the same?**

(Cuban, 2001, 195-196)

“From my inquiry into Silicon Valley Schools I have concluded that [...] every student, like every worker, will eventually have a personal computer. But no fundamental change in teaching practices will occur.”

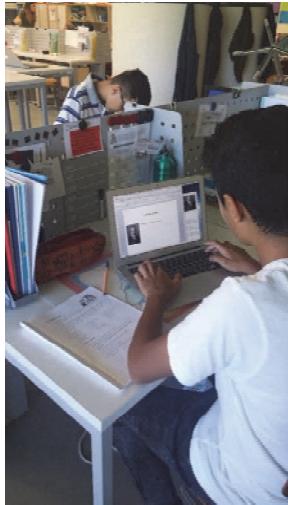
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## **«Personalized Learning» as a way forward?**

1. Differentiated learning, adapted for groups by the teacher
2. Individualized learning, adapted for individuals by the teacher
3. Personalized learning, guided by the students themselves

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## The perLen Study



- Personalized learning in heterogeneous learning communities
- N = 65 different personalized schools, primary and secondary schools
- Longitudinal section over three years: 2013 - 2016
- Teacher questionnaires, Student questionnaires, Student tests, Interviews Case studies....



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**STIFTUNG  
MERCATOR  
SCHWEIZ**

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## Digital technologies in schools with personalized learning concepts



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## Reasons for the intensive use of digital technologies in personalized schools

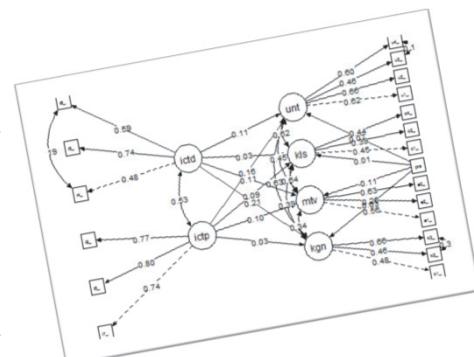


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## Personalized Learning with digital technologies → better teaching ?

	Cognitive Activation	Motivational Engagement	Class-room Management	Instructional Support
General degree of Personal Learning in School	0.031	-0.107	0.010	0.068
Personalized Learning with Digital Technologies	0.028	0.102	0.095	<b>0.163**</b>
Indiv./Diff. Learning with Digital Technologies	<b>0.209**</b>	0.109	0.027	0.111



Chi2(148)=177.302, CFI = .985, TLI = .980, RMSEA = .015, SRMR = .032

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## Frequency of computer use: at least once a week

8. Klassen perLen 2014 (N = 1017) vs. 8. Klassen ICILS 2013 CH (N= 3225)

	perLen Schulen	ICILS Benchmark CH
• Use of Computers in School	75%	34%
• Use of Computers at Home	88%	86%
• Use of Computers elsewhere	25%	6%

Petko, D., Schmid, R., Pauli, C., Stebler, R. & Reusser, K. (in Press). Personalisiertes Lernen mit digitalen Medien: Neue Potenziale zur Gestaltung schülerorientierter Lehr- und Lernumgebungen. *Journal für Schulentwicklung*.

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[www.perlen.uzh.ch](http://www.perlen.uzh.ch)

## PISA 2012: More frequent ICT use in personalized learning

(OECD, 2015, p. 16-17)

“PISA data show that [...] among all teachers, those who are more inclined and better prepared for student-oriented teaching practices, such as group work, individualised learning, and project work, are more likely to use digital resources, according to students.”

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## **Meta-Analyses: A matter of quality**

(Hattie, 2008, p. 221)

«An analysis of the meta-analyses of computers in schools indicates that computer are used effectively (a) when there is a diversity of teaching strategies; (b) when there is a pre-training in the use of computers as a teaching and learning tool; (c) when there are multiple opportunities for learning [...]; (d) when the student, not teacher, is in «control» of learning; (e) when peer learning is optimized; and (f) when feedback is optimized.»

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## **Digital transformation of schools goes beyond digital aspects**

- Personalization instead of standardization
- Problem solving instead of knowledge transfer
- Media and information technology as new literacy
- Upgrading of complex skills & longer qualification paths
- Shaping the future instead of just understanding it

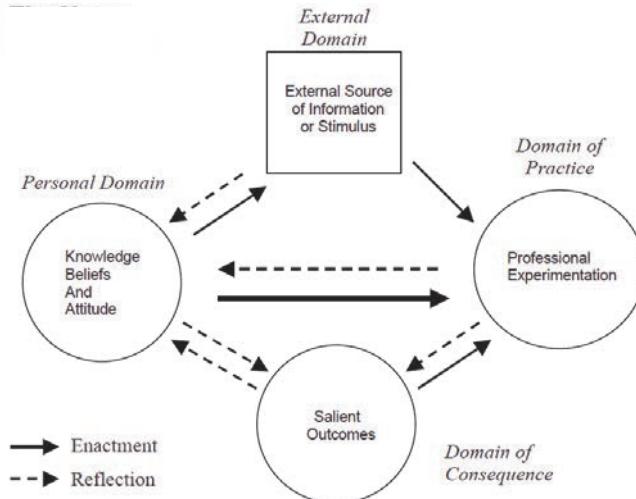
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## How do we support this transformation in teacher education?

(Clarke & Hollingsworth, 2002)

- Reflection on one's own abilities/ beliefs
- Offering theories, concepts and models
- Professional experimentation
- Observing outcomes in practice



Clarke, D., & Hollingsworth, H. (2002). Elaborating a model of teacher professional growth. *Teaching and teacher education*, 18(8), 947-967.

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## Collaborative Practitioner Research: Projektschule Goldau

The screenshot shows the website of Projektschule Goldau. The main navigation menu includes Home, Projektschule, Team, Projekt "Brings mit!", Projekt "Digitaler Alltag", iPhone-Projekt, App-Liste, Berichte, and Impressum. A news article titled "Als BYOD-Klasse in der „Flimmerpause“" is displayed, published on June 2, 2017, by Patrik Bernhard. The article features a photo of students using their phones during a break. To the right, there are sections for "Neue Beiträge" and "Neue Kommentare".

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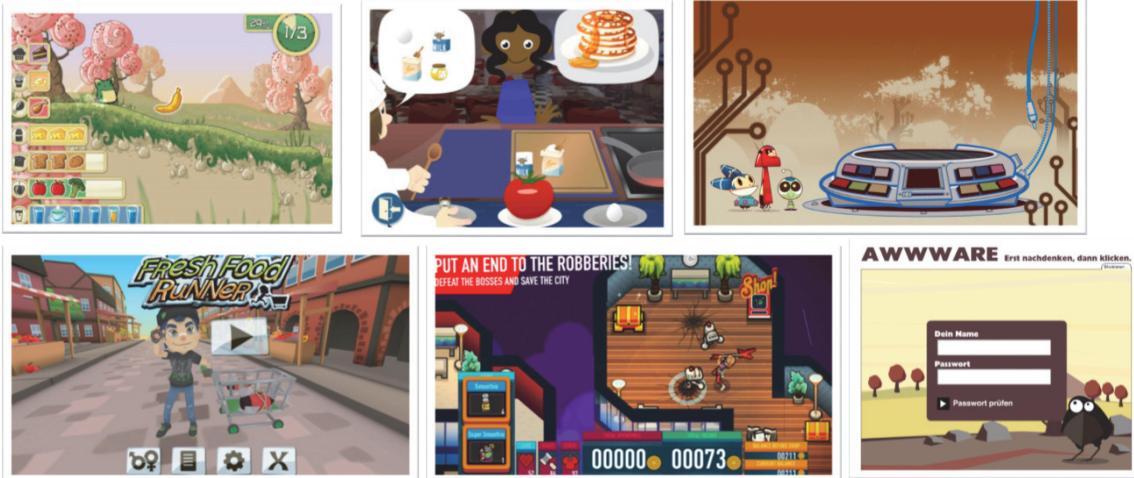
[www.learningview.org](http://www.learningview.org)

The screenshot shows the homepage of LearningView. At the top, there is a navigation bar with links for HOME, FUNKTIONEN, KONTAKT, APP HERUNTERLADEN, and LOGIN. Below the navigation bar, there is a large image of a smartphone displaying the LearningView mobile application interface. The app screen shows a blue header with 'LERNINHALTE' and a list of topics under 'Rechnen', including 'Schätzen und runden'. To the right of the phone, the LearningView logo is displayed with the tagline 'Wochenpläne - Lernstände - Lernjournal'. Below the logo are two buttons: 'Mit meinem Konto anmelden' and 'Erste Schritte für Lehrpersonen'. The page number '19' is located at the bottom right.

[www.learningapps.org](http://www.learningapps.org)

The screenshot shows the homepage of LearningApps.org. At the top, there is a search bar with the placeholder 'Apps durchsuchen', a browse button 'Apps durchstöbern', and a create button 'App erstellen'. Below the search bar, there are two buttons: 'Was ist LearningApps.org?' and 'Tutorial anzeigen'. On the left, there is a section titled 'Tweets über LearningApps.org' with a tweet from 'D Pohl @dcspohl'. On the right, there is a vertical list of languages with their respective flags: Bosanski, Deutsch (highlighted), Eesti, English, Español, Français, Galego, Italiano, Lietuvių, Magyar, Nederlands, Polski, Русские, Român, Rätoromanisch, Türkçe, Čeština, Беларусь, България, and Українська. The page number '20' is located at the bottom right.

## Serious Games



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## www.unterrichtsvideos.ch

unterrichtsvideos.ch

Universität Zürich phsz

VIDEOS

ÜBER

FAQ

NUTZUNGSBEDINGUNGEN

KONTAKT

Fach:

Alle

Schulstufe:

Alle

Land:

Alle

Suchen:



▶ VIDEO ABSPIELEN

### WebQuest zum Thema Wasser

Schülerinnen und Schüler der dritten Primarstufe informieren sich mit Hilfe einer vorgegebenen Internetseite über einen speziellen Bereich des Themas «Wasser». Zu zweit bearbeiten sie in einer Doppelkollektion je einen Aspekt des Themas und halten alle wichtigen Informationen schriftlich und grafisch fest. Zur Gestaltung eines Posters soll später auf diese Informationen zurückgegriffen werden können.

Fach: Mensch & Umwelt  
Stufe: Primarstufe  
Aufnahmejahr: 2007  
Land: Schweiz  
Quelle: PH Schwyz



▶ VIDEO ABSPIELEN

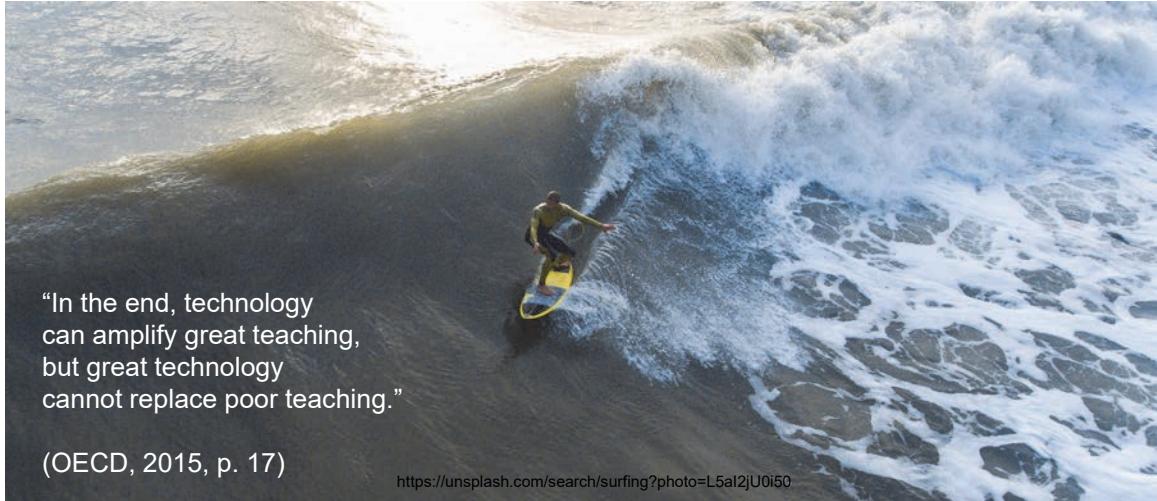
### Üben von Längenmassen und Grundoperationen

Individuell oder in Partnerarbeit bearbeiten die Lernenden der dritten Klasse verschiedene Aufgaben zum Thema Längenmasse und Grundoperationen. Einzelne Aufträge sind dabei am Computer zu erledigen, die Lernenden finden diese auf ihren persönlichen USB-Sticks. Zum Abschluss der Lektion schildern die Schülerinnen und Schüler im Kreis ihre Erfahrungen mit den Aufträgen.

Fach: Mathematik  
Stufe: Primarstufe  
Aufnahmejahr: 2005  
Land: Schweiz  
Quelle: PH Schwyz

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"In the end, technology  
can amplify great teaching,  
but great technology  
cannot replace poor teaching."

(OECD, 2015, p. 17)

<https://unsplash.com/search/surfing?photo=L5al2jU0i50>