The influence of digital devices on learning interest, engagement and academic performance in basic police training – Experiences and findings

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Micha Fuchs & Kristina Ott
Headquarters of the Bavarian Riot Police
Speakers

Micha Fuchs
- Training and educational specialist
- PhD-Candidate
- M.A. Educational Science

Work priorities
- Continuing education of teachers
- Media education
- Evaluation

micha.fuchs@polizei.bayern.de

Kristina Ott
- Police Commissioner
- Senior staff for the implementation of the digitalisation strategy of the Bavarian Police Training

Work priorities
- Digitalisation of police training
- Supply of hardware and software

kristina.ott@polizei.bayern.de
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Bavarian Police Training

Pictures: Bavarian Police

www.polizei.bayern.de/bepo
Bavarian Police

Population 13.1 million
Area 70,400 km²
Capital Munich

32,600 police officers (all ranks)
+ 3,800 trainees (2022)

44,000 approx.
Bavarian Police Training

- two and a half years of police training (divided into five terms) with approx. 5000 hours of classroom lessons + practical trainings

- 2 internships at local police stations for 4 weeks (during the 3rd term of training) and for 12 weeks (during the 4th term of training)

- 4 guided themes: office operations, traffic, (modular training) on patrol, crime fighting

- 6 police academies, divided in 28 organisational units of 100 to 160 police officer trainees plus staff

- around 700 police teachers and instructors

- all trainees perform their complete training process within their respective units from start to finish
Current situation – Overview on digital equipment

- By 2025 (perhaps earlier), every police officer trainee will receive a convertible
- March 2022: 2,300 police officer trainees received a personal convertible (police officer trainees from the 2nd – 4th-term)
- mPolice smartphones in sufficient quantity for each organisational unit
- Digital whiteboards in every classroom of the police academies
- Use of the learning management system (LMS) including newly created learning and teaching materials
- Each police academy is provided with an operation centre for practice purposes
- Improvement of the technical infrastructure (for example procurement of mobile wlan-router)
Starting point

- In October 2019, the Bavarian Police decided to equip one organisational unit with digital devices → digital project unit
- All classrooms equipped with digital whiteboards
- All police officer trainees received convertibles and smartphones
- Two ways of using the convertible:
  a) Digital device as learning medium (e.g. taking lecture notes, looking things up on the internet, preparing for exams, but also conducting their exams with the convertible, video-conferencing)
  b) Digital device as operational tool (e.g. taking a sketch of a traffic accident, using an app for identification) and preparing for duty after the police training
- Strong political interest and support for the “Bavarian way”

Source: Bavarian Police, 2021
Method – Research design

Period: December 2019 to July 2021

Participants: 99 police officer trainees, 29% female, age Ø 22 years old (= one organisational unit)

Intervention: all five classrooms were equipped with interactive whiteboards (IWB), all police officer trainees and police teachers received a convertible & smartphone in May 2020; introductory workshops were held for each digital device

Method: standardised questionnaire

Points in time: 
- \( T_1 \) January 2020, end of 2nd term, before first COVID-19-lockdown
- \( T_2 \) November 2020, 4th term, before the second internship (12 weeks)
- \( T_3 \) July 2021, end of 5th term, after the final exams

Important to keep in mind: The entire project took place during the COVID-19 pandemic
<table>
<thead>
<tr>
<th><strong>Method – Instrument/Measures</strong></th>
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</thead>
<tbody>
<tr>
<td><strong>Student engagement</strong></td>
</tr>
<tr>
<td><strong>Learning interest</strong></td>
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</tbody>
</table>
| **Frequency of usage behaviour** | a) scale 1 classroom-related behaviour  
  b) scale 2 field-related behaviour  
  5-point Likert scale  
  (1 = never; 3 = several times a week; 5 = several times a day) |
| **Visualisation of teaching content** | 5-point Likert scale from 1 (negative) to 5 (positive) with three items (e.g. “The use of the interactive whiteboard has changed the visualisation of the teaching content in class.”) |
| **Academic performance**         | Comparison of the a) written midterm exams in July 2020 and b) the results of the written final exam in May 2021 between the digital project unit (N = 99 police trainees) and five other organizational units (N = 629) |
| **Mobile devices as operational tools** | 5-point Likert scale from 1 (negative) to 5 (positive), e.g. “The use of the tablet PC has improved my practical competence in using the tablet PC as an operational device”. |
| **Future teaching and learning material** | Rating of the future importance of traditional (e.g. books, worksheets) and digital teaching and learning materials (e.g. tablet PC, videos) in the classroom on a 10-point scale from 1 (very unimportant) to 10 (very important) |
The use of the interactive whiteboards immediately and sustainably increased the learning interest as well as the visualisation of the teaching content.

Note: Results with different code letters (a, b) differ significantly on a 5%-level between measurement time points.
Mobile devices

Findings 2

Figure 2. The influence of digital devices on learning interest and engagement between T₁ and T₃
Scale: 1 = negative; 3 = neither negative nor positive; 5 = positive

Figure 3. The frequency of use of mobile devices during the measurement points T₂ and T₃
Scale: 1 = never; 3 = several times a week; 5 = several times a day

→ an overall positive influence of the tablet PCs on the learning interests of the police officer trainees
→ no influence of the smartphone on learning interest and only sporadic use of smartphones
### Relationship between frequency of use of mobile devices in relation to learning interest and engagement of police officer trainees in terms of different usage behaviour.

<table>
<thead>
<tr>
<th></th>
<th>(1) Overall intensity use</th>
<th>(2) Intensity classroom behaviour</th>
<th>(3) Intensity service-related behaviour</th>
<th>(4) Learning interest</th>
<th>(5) Engagement/activation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tablet PC</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1) Overall intensity use</td>
<td>-</td>
<td>.89**</td>
<td>.89**</td>
<td>.51**</td>
<td>.44**</td>
</tr>
<tr>
<td>(2) Intensity classroom behaviour</td>
<td>-</td>
<td>-</td>
<td>.58**</td>
<td>.53**</td>
<td>.49**</td>
</tr>
<tr>
<td>(3) Intensity service-related behaviour</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>.37**</td>
<td>.29**</td>
</tr>
<tr>
<td>(4) Learning interest</td>
<td></td>
<td></td>
<td></td>
<td>-</td>
<td>.87**</td>
</tr>
<tr>
<td>(5) Engagement/activation</td>
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<td></td>
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<td></td>
<td>-</td>
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<tr>
<td><strong>Smartphone</strong></td>
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</tr>
<tr>
<td>(1) Overall intensity use</td>
<td>-</td>
<td>.91**</td>
<td>.92**</td>
<td>.10</td>
<td>.12</td>
</tr>
<tr>
<td>(2) Intensity classroom behaviour</td>
<td>-</td>
<td>-</td>
<td>.68**</td>
<td>.07</td>
<td>.10</td>
</tr>
<tr>
<td>(3) Intensity service-related behaviour</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>.10</td>
<td>.12</td>
</tr>
<tr>
<td>(4) Learning interest</td>
<td></td>
<td></td>
<td></td>
<td>-</td>
<td>.97**</td>
</tr>
<tr>
<td>(5) Engagement/activation</td>
<td></td>
<td></td>
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<td>-</td>
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</tbody>
</table>

Note: ** = p < .01

→ Positive correlation between frequency of use of the convertible and learning interest as well as active participation of police officer trainees in lessons
Tablet PCs: the t-test shows no significant change over the course of the project, $t(159) = .053, p > .05., d = -0.09$

Smartphones: no significant time trend ($t(159) = .38, p > .05, d = -0.06$)
### Academic performance – Project unit vs. reference units

Descriptive statistics between the **project unit** and its **reference units** in terms of grade points for the **midterm examination** and the **final written examination**.

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>M (SD)</th>
<th>Median</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Midterm exam</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project unit</td>
<td>93</td>
<td>9.23 (1.95)</td>
<td>9.50</td>
<td>5.50</td>
<td>12.75</td>
</tr>
<tr>
<td>Reference units</td>
<td>629</td>
<td>9.09 (1.85)</td>
<td>9.00</td>
<td>4.25</td>
<td>13.50</td>
</tr>
<tr>
<td><strong>Final written exam</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project unit</td>
<td>92</td>
<td>8.77 (1.67)</td>
<td>8.94</td>
<td>5.12</td>
<td>12.75</td>
</tr>
<tr>
<td>Reference units</td>
<td>617</td>
<td>8.83 (1.83)</td>
<td>8.75</td>
<td>4.00</td>
<td>13.62</td>
</tr>
</tbody>
</table>

Note: Grading scale: 0.00-1.99 ≙ very poor (fail), 2.00-4.99 ≙ unsatisfactory (fail), 5.00-7.99 ≙ satisfactory, 8.00-10.99 ≙ good, 11.00 -13.49 ≙ very good, 13.50-15.00 ≙ excellent

The t-tests showed no significant difference between both groups:

- **Midterm exam**: \( t(720) = 0.70, p = .48 > .05, d = 0.08 \)
- **Final exam**: \( t(707) = -0.29, p = .77 > .05, d = 0.03 \)
Findings 6

Traditional vs. digital teaching & learning material

Assessment of the importance of future teaching and learning materials in the classroom over the course of the digital pilot project.

Scale: 0 = very unimportant to 10 = very important

The importance of digital teaching and learning materials in the classroom increases continuously ➔ The young police officer trainees want to learn with digital teaching and learning material.
Conclusions

- The use of digital whiteboards and convertibles can directly support and improve police training in terms of teaching and learning settings.

- Smartphones are only used sporadically, so their use needs to be better trained and explained.

- The empirical findings showed no significant difference between the digital project unit and the reference organizational units (but we must bear in mind that the COVID-19 pandemic occurred with all its consequences, e.g. closure of police academies, home schooling)

→ Final conclusion: Although there is still a long way to go before digitalisation is fully (and successfully) implemented in the Bavarian police, we are no longer discussing whether, but only how we want to proceed.
Practical implications

1. **Qualification** and training for teachers and instructors play a **key role** in integrating technology into teaching and practical training. In addition, the training courses should have a high practical relevance, where the various digital devices (above all the use of smartphones) can be actively tried out.

2. **Hardware** (digital devices) and **software** (e.g. learning management system (LMS)) as well as the **technical infrastructure** must **function properly** to ensure acceptance by police teachers and trainees.

3. An **LMS in the police network** is necessary to be able to use all teaching and learning material.

4. Learning and **teaching materials** need to be adapted to the **new** learning and teaching context (e.g. more **gamification**), therefore new forms of learning and teaching material need to be created e.g. **interactive videos, quizzes, wikis, learning modules**.

5. To improve teaching and learning in combination with digital devices and to meet the requirements of the new generation of police officer trainees, **new teaching forms** such as just-in-time teaching and **flipping the classroom** should be tried.
The Bavarian way to face digitalisation in basic police training

Didactical Concept

Qualification of teachers

Hardware + Software

Digitalisation

Learning Platform
Future prospects of our scientific work

How do we proceed?

- Scientific cooperation-project with the Ludwig-Maximilian-University Munich from April 2022 to March 2025 (a whole course of police training)

- Following issues will be addressed:
  - benefits and constraints in teaching and learning due to full digital equipment
  - what are the factors of success for sustainable learning on the part of teachers?
  - how can the potential of digital devices and media support the social competences of the police officer trainees?
  - changes and effects of digital media for training and everyday police life in the short-term perspective (e.g. in internships) and in the long-term perspective (in regular police service).
For further information and questions:

Micha Fuchs: micha.fuchs@polizei.bayern.de

Kristina Ott: kristina.ott@polizei.bayern.de