Studies •

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DIGITAL COMPETENCES IN PUBLIC SECTOR EDUCATION AS A PREREQUISITE FOR E-GOVERNMENT[1]

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e-Government in Germany is usually not ranked top of the class in Europe. Rankings, such as the EU eGovernment Benchmark 2022, UN E-Government Development Index and others show that Germany is rather poorly ranked among the developed nations of the world. The authors assume that there is a correlation between the quality of Public Sector Education regarding digital competences and the quality of e-Government the so digitally educated civil servants can deliver. Civil servants in Germany usually graduate from one of the approximately 20 main universities of public administration; hence, an overview of the digital competences taught there is the core of this article. The main result is that both the quantity and the quality of digital competences taught need to be improved and, in the worst case depend on the university chosen, even zero digital competences are taught to the future civil servants.

KEYWORDS:
Public Sector Education, e-Government, curricular development

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[1]   This work is the continuation of a series of publications on this topic which started with an article in Behördenspiegel 7/2022 in July 2022.

THE STATUS OF E-GOVERNMENT IN GERMANY

Rankings

Rankings of complex course programmes do have significant shortcomings,[2] but they can at least provide a good image of where a specific entity stands when putting several rankings together. When looking at the leading institutions of the World, Europe and Germany the rankings and analysis of German e-Government look like the following:

(i)　United Nations E-Government Survey 2020:[3] "Thirteen countries with very high levels of human capital development and well-developed infrastructure (Barbados, Belarus, Belgium, Brunei Darussalam, Czech Republic, Germany, Greece, Israel, Latvia, Liechtenstein, Romania, Saudi Arabia and Slovakia) have relatively lower OSI[4] values. Apart from Barbados and Brunei Darussalam, these countries also have very high EGDI[5] values, but focusing on improvements in online services provision could greatly accelerate progress in overall e-government development."[6] Germany ranks 25th among the countries with the highest EGDI values, well behind countries like Cyprus, Malta, Poland, Slovenia and United Arab Emirates. Infrastructure criteria like the Telecommunications infrastructure index are 0.8856 and lag behind countries like Cyprus (0.9057), Malta (0.9232), New Zealand (0.9207), UAE (0.9344) but also larger countries like the USA (0.9182). The Online Service Index stands at 0.7353, which sounds not encouraging when compared to Albania (0.8412), Argentina (0.8471), Belarus (0.7059), Brazil (0.8706), Bulgaria (0.7706), Chile (0.8529), China (0.9059), Croatia (0.7522), Cyprus (0.8706) and the Czech Republic (0.7235).[7] According to the press the ranking did not improve since the survey, rather the opposite: Germany lost 13 ranks and fell from 12th to 25th place.[8]

(ii)　European Commission eGovernment Benchmark 2022:[9] Germany ranks 21st among 35 countries included in the benchmark in overall eGovernment maturity. Hungary ranks 20th, the Czech Republic ranks 22nd. Countries economically peers of Germany rank 18th (France), 24th (Italy) and 11th (Spain).[10] The country fact sheets are more conclusive, the detailed values for Germany are:[11]

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[2]　Fassrainer–Müller-Török 2013.
[3]　United Nations 2020.
[4]　OSI stands for Online Services Index in the quoted publication.
[5]　EGDI stands for E-Government Development Index in the quoted publication.
[6]　United Nations 2020: 21.
[7]　United Nations 2020: 266 (after "c" the comparison was ended because the demonstration effect is already sufficient).
[8]　Cf. Bavarian Research Institute for Digital Transformation 2020.
[9]　European Commission 2022a.
[10]　European Commission 2022a: 9.
[11]　European Commission 2022b: 23.

Studies ●

a. User Centricity: 91, EU average 88.3
b. Transparency: 49, EU average 59.5
c. Key Enablers: 60, EU average 68.7
d. Cross-Border Services : 53, EU average 54.5

An interesting single observation is the eID issue. eID is considered a key enabler, here Germany gets 53 at an EU average standing at 62.8; but also an enabler of cross border services, here Germany gets 10 at an EU average of 23.8. Also very interesting is the penetration indicator, which states how many individuals used the internet for interaction with public authorities. Here Germany is fourth-last in class before Italy, Bulgaria and Romania. The figure for Germany is 55% while the EU average stands at 71%.[12]

(iii)   The Commission of Experts for Research and Innovation (EFI) publishes annual Reports on behalf of the Federal Government of Germany. These reports include also statements and findings on e-Government.

a. Report 2022:
"Furthermore, Germany should vigorously promote e-government."[13]

b. Report 2021:
"Compared with other European countries, Germany is lagging considerably and increasingly behind in e-government. The Commission of Experts advises vigorous pursuit of the goals set in the Online Access Act (*Onlinezugangsgesetz*) of making all public administrative services digitally available by 2022."[14]

c. Report 2018:
"Targets for the year 2025 […] Take on a pioneering role in e-government."[15]

d. Report 2017:
"Germany is lagging behind in e-government and is therefore wasting important innovative and value-creation potential." "Although Germany's e-government has now reached the level of the leading nations – Estonia, Finland, South Korea and the USA – in simple forms of interaction such as the provision of information by authorities, Germany is a long way behind the leading nations when it comes to the more advanced Stage 4 services, such as individualised services."
"E-government services in Germany are fragmentary and often not fully digitised."
"E-government is used less intensively by citizens in Germany than in other countries as a result of the fragmentary range of services and low level of user-friendliness." [16]

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12   European Commission 2022c: 7.
13   Commission of Experts for Research and Innovation 2022: 14.
14   Commission of Experts for Research and Innovation 2021: 34.
15   Commission of Experts for Research and Innovation 2018: 22.
16   Commission of Experts for Research and Innovation 2017: 104.

(iv) European Commission Digital Economy and Society Index 2022:[17]
Germany ranks 13th among 27 EU members in the index.[18] Some interesting facts regarding Germany are:[19]
   a. Digital Skills: rank 22
   b. Fibre to the premises (FTTP) coverage mid 2021: rank 26
   c. Digital Public Services : rank 18
   d. e-Government users interacting online with public authorities over the internet in the last 12 months: rank 24
   e. Pre-filled forms: rank 23
   f. Key enabler status in Member States: rank 21

Interesting quotes from the country report for Germany are:[20]
   – "As the EU's largest economy, Germany's progress with digital transformation in the coming years will be crucial, to enable the EU as a whole to reach its 2030 Digital Decade targets."[21]
   – "Performance on Digital public services is mixed. Germany scores well on open data, but interaction between the government and the public could be improved. Germany needs to continue with the work it is doing to achieve the Digital Decade target of 100% online provision of key public services for European citizens and businesses."[22]

With a view to the paper's topic, the table "Human Capital" is alarming.[23] Regarding "At least basic digital skills", "Above basic digital skills" and "At least basic digital content creation skills" are all below the EU average.[24] Only the figures regarding IT specialists are above or at EU average.

It is obvious that the e-Government of Germany is not at the level that would be expected from a G7 Member State.

Perceptions of the public, the press and comparisons with other states

The press in Germany recently acknowledged broadly that e-Government in Germany is lagging behind most European nations.[25] Recent press articles state that the citizens have

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17   European Commission 2022d.
18   European Commission 2022e: 3.
19   Cf. European Commission 2022d.
20   European Commission 2022e.
21   European Commission 2022e: 3.
22   European Commission 2022e: 4.
23   European Commission 2022e: 7.
24   European Commission 2022e: 7.
25   For a stochastic selection of statements from the press, consulting companies and business lobbyists cf. DAMS–KAISER 2017; BÜRING–SANS 2021; GOTTBEHÜT 2021; IWD 2022.

Studies •

to stand in long lines at Citizens Service Centres for e.g. new passports and, unfortunately often in vain.[26] In Stuttgart, capital of the Federal State of Baden-Württemberg, the mayor appointed a Task Force for dealing with the situation at the Citizens Service Centres.[27]

In order not to provide anecdotic evidence, we refer to statements by the Federal Government of Germany in their most recent Digital Strategy:[28]

    (i)   "Until now we are in the Digital Economy and Society Index DESI 2022 index overall ranked 13th out of EU27"[29]

    (ii) Dimension Human Capital ranked 16th out of EU27

    (iii) Dimension Integration of digital technology 16th out of EU27

    (iv) Dimension Digital public services 18th out of EU27

The strategy paper concludes with the statement, that this cannot and must not be considered sufficient for a nation which wants to actively play in the international premier league.

PUBLIC SECTOR EDUCATION IN GERMANY

The system of Universities of Public Administration in Germany

Germany operates a system of universities, mostly universities of applied sciences, which are dedicated to the education of civil servants. This system includes 38 universities, probably a few more.[30]

Most of the universities offer a Bachelor Degree in Public Administration at the level of a university of applied sciences. This course consists mostly of four semesters at the university and two to three semesters with agencies, probably their future employing agency.

The core content of the teaching is, at a very high level, defined by a common paper of the conference of the ministries of the interior of Germany (all 17).[31] The paper was amended

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[26]   Cf. Jᴀʜɴs 2022; SWR 2022.

[27]   Landeshauptstadt Stuttgart 2022.

[28]   Federal Ministry for Digital Affairs and Transport s. a. Note that the paper is published on an official government website but lacks date and place of issue as well as authors. For https://digitalstrategie-deutschland. de/impressum/ we believe it is authentic.

[29]   Federal Ministry for Digital Affairs and Transport s. a.: 3 (translated by the authors).

[30]   According to the list of the conference of the rectors of the universities of public service, cf. www.rkhoed.de/ hochschulen/. Note that not all of them provide official English versions of their names; hence the authors had to translate on their own sometimes.

[31]   Ständige Konferenz der Innenminister und Senatoren der Länder, Anforderungen für Studiengänge an internen Fachhochschulen sowie an Fachhochschulen, deren Abschlüsse einer Ausbildung für den gehobenen allgemeinen (nichttechnischen) Verwaltungsdienst gleichgestellt werden können. Zur Wahrung der Einheitlichkeit laufbahnrechtlicher Anforderungen nach § 14 Abs. 2 bis 4 BRRG (online: www. innenministerkonferenz.de/IMK/DE/termine/to-beschluesse/05-06-24/05-06-24-anlage-nr-26-2.pdf?__ blob=publicationFile&v=2).

in 2005.[32] Unfortunately, it was not amended ever since, because the competence of the Federal Republic to regulate these affairs was transferred to the Federal States at the last reform of the German Fundamental Law a few years later.

Each of the 16 federal states and the Federal Republic itself issued a legal act, a regulation concerning the requirements for a career in Public Administration.[33] These regulations are the basis for the universities issuing their own regulations (including syllabi), thereby limiting them.

The Content

The ICT content of the studies of Public Administration in Germany looks, as compared to the content in psychology and sociology, and to civil law like the following:

Table 1 • *Selected content of Public Administration Studies in Germany*

Federal State	University	Studies	Total teaching hours ICT	Total teaching hours psychology and sociology	Total teaching hours civil law
Baden-Württemberg	HS Kehl, HS Ludwigsburg	Public Management	48.75	72.6	127.5
Bavaria	HföD Bayern AIV	Diplom-Verwaltungswirt (FH)	58.5	43.5	93
Berlin	HWR	Öffentliche Verwaltung	40.5	64.8	40.5
Brandenburg	TH Wildau	Öffentliche Verwaltung Brandenburg	45	45	90
Bremen	HS Bremen	Public Administration was transferred to a regular university.	45	22.5	67.5
Federal Republic	HS Bund	Allgemeine Innere Verwaltung	0	33	105
Hamburg	an der HAW Hamburg, keine eigene HÖD	Public Management	96	72	96

32 Positionspapier zur Gleichwertigkeit von Bachelor-Studiengängen und -Abschlüssen mit Diplom Studiengängen und -Abschlüssen an Fachhochschulen im Rahmen einer Ausbildung für den gehobenen allgemeinen (nichttechnischen) Verwaltungsdienst. Ergänzung zum Positionspapier der Innenministerkonferenz vom 19./20.11.1998 (online: http://docplayer.org/25730643-Ergaenzung-zum-positionspapier-der-innenministerkonferenz-vom-19-die-nachstehenden-ausfuehrungen-beziehen-sich-auf-bachelor-studiengaenge.html).

33 For the regulation of, for example, Bavaria see Free State of Bavaria 2011.

Studies •

Federal State	University	Studies	Total teaching hours ICT	Total teaching hours psychology and sociology	Total teaching hours civil law
Hesse	HfPV	Public Administration	0	115.5	74.25
Mecklenburg-Vorpommern	FH Güstrow	Öffentliche Verwaltung	18	63	159
Lower Saxony	HSVN	Allgemeine Verwaltung	0	40.5	94.5
North Rhine-Westphalia	HSPV	Allgemeine Verwaltung (LL.B.)	0	90	93
Rhineland-Palatinate	HÖV RLP	Allgemeine Verwaltung	0	14.25	72
Saarland*	FHSV Saar	Allgemeiner Verwaltungs-dienst			
Saxony	HS Meißen	Allgemeine Verwaltung	78	67.5	81.75
Saxony-Anhalt	HS Hartz	Öffentliche Verwaltung	0	67.5	45
Schleswig-Holstein	FHVD	Allgemeine Verwaltung / Public Administration	16.5	16.5	16.5
Thuringia	Thüringer FH für ÖV	KSAV	45	45	97.5
Average			**30.70**	**54.57**	**84.56**

Source: Taken from the publicly available module catalogues and syllabuses of the public administration study programs.

Please note that the subjects compared were chosen randomly, this should not be a value judgement about the importance of these subjects. Unfortunately, the secondary school system does not provide students with these basic IT skills either.

Just five out of 16 Federal States of Germany have ICT as a mandatory part of secondary education.[34]

Why is the ICT teaching content of Public Administration studies in Germany so small as compared to other subjects? One has to consider that Germany is highly decentralised with 16 highly independent Federal States plus the Federal Republic itself, which have regulations issued by their respective Ministries of the Interior, regulating the content of the Public Administration studies in the respective Federal State. 12 of these 17 regulations do not even mention ICT, digital courses or such subjects. There is an agreement in the Federal States paper mentioned above,[35] which set some minimum standards.

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[34] Informatik Monitor, Gesellschaft für Informatik (GI), 15.03.2021.
[35] Positionspapier zur Gleichwertigkeit von Bachelor-Studiengängen und -Abschlüssen mit Diplom Studien-gängen und -Abschlüssen an Fachhochschulen im Rahmen einer Ausbildung für den gehobenen allgemeinen

Unfortunately – for the ICT knowledge of the civil servants in Public Administration – the last big reform of the German Fundamental Law took away the Federal Republic's competence to set a framework, i.e. calling for minimum ICT content of these studies.

In addition, the respective universities, which had to transform the regulation on the level of the respective Federal State into syllabi and regulations, failed at times as well. If we take Lower Saxony for example, the universities there should teach ICT in the Public Administration studies – but they do not, their syllabi and regulations on university level fail to comply with the regulations of Lower Saxony.

The authors analysed all the syllabi and regulations and found the following:

Table 2 • *Selected content of Syllabi and Regulations concerning Public Administration Studies in Germany*

		Regulation at the level of the Federal State			
		Digital competences explicitly mentioned	Digital content in the regulation	ICT relevant for exams	Any ICT share of teaching hours implemented
1	Baden-Württemberg	no	yes	yes	yes
2	Bavaria	n/a	yes	yes	yes
3	Berlin	no	no	n/a	yes
4	Brandenburg	n/a	no	n/a	yes
5	Bremen	n/a	yes	yes	n/a
6	Federal Republic of Germany	no	no	n/a	**NONE**
7	Hamburg	no	yes	yes	yes
8	Hesse	no	yes	yes	**NONE**
9	Mecklenburg-Vorpommern	n/a	yes	yes	Yes
10	Lower Saxony	n/a	yes	yes	**NONE**
11	North Rhine-Westphalia	n/a	yes	yes	**NONE**
12	Rhineland-Palatinate	n/a	yes	yes	**NONE**
13	Saarland	n/a	yes	no	no data available
14	Saxony	n/a	no	n/a	yes
15	Saxony-Anhalt	n/a	no	n/a	**NONE**
16	Schleswig-Holstein	n/a	yes	yes	yes
17	Thuringia	yes	yes	yes	yes

Source: Taken from the public available regulatory/statutory requirements of the states and the federal government.

(nichttechnischen) Verwaltungsdienst. Ergänzung zum Positionspapier der Innenministerkonferenz vom 19./20.11.1998 (online: http://docplayer.org/25730643-Ergaenzung-zum-positionspapier-der-innenminis-terkonferenz-vom-19-die-nachstehenden-ausfuehrungen-beziehen-sich-auf-bachelor-studiengaenge.html).

Studies •

It is obvious that not all Federal States fully comply with their own legal obligations and it is also obvious that the level of ICT knowledge acquired at the universities when studying Public Administration differs significantly from Federal State to Federal State.

RECOMMENDED FIXES

If we recall the introducing lines of this study, the state of e-Government in Germany is saddening in the international comparison. We have shown that the staff, whose task is to digitalise Public Administration, is poorly trained both in their secondary and tertiary level education with respect to ICT knowledge.

In order to improve this situation, we have to distinguish between a short and a medium-term horizon. But this alone cannot solve the issue that a long-term strategy has to be conducted to generate an adequate ICT learning track as part of the education for public administration. Also, the lack of ICT knowledge students get during secondary education must be addressed.

Quick win: ICDL adaption

There is a worldwide agreed and recognised education program which provides basic as well as advanced ICT knowledge: The International Certification of Digital Literacy (ICDL),[36] formerly known as European Computer Driving License (ECDL). It consists of several modules, grouped into:[37]
- ICDL Workforce Modules
  - Essential Skills
    - Application Essentials
    - Computer and Online Essentials
    - Computer Essentials
    - Online Essentials
  - Office Applications
    - Documents
    - Spreadsheets
    - Presentation
  - Good Practice
    - IT Security
    - Online Collaboration
    - Data Protection

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[36] Cf. icdl.org.
[37] Cf. https://icdl.org/icdl-programmes/. The authors listed only those modules, which they believe fit into a Public Administration education.

- ICDL Professional Modules
  - Creative
    - Presentations (Advanced)
    - Documents (Advanced)
  - Entrepreneurial
    - Digital Marketing
    - Project Planning
    - E-Commerce
  - Computational
    - Management Spreadsheets
    - Financial Spreadsheets
    - Data Analytics
    - Using Databases
- ICDL Digital Students Module[38]
  - Essential Skills
    - Information Literacy

Remarkably, ICDL is a mandatory content in many countries, e.g. for Austrian police officers and army officers and in Austrian secondary schools it is offered to each pupil, but in Germany it is often only considered for the unemployed by the employment administrations as individual training measure.[39]

The modules are available as online trainings together with a decentralised exam infrastructure, hence it can be easily implemented for the Public Administration universities within a few months.

Medium range: eGov-Campus curriculum integration

The so-called eGov-Campus[40] is a project on behalf of the central Germany's governments IT institution, the IT-Planungsrat, the intention to provide e-Government teachers with teaching materials, easily available and implementable. Several reputable universities are project partners. A number of such modules does exist and is available for self-learning online.

The modules available have a workload of around 150 hours each; hence for a use in the real world the creation of smaller modules seems to be more appropriate. The German University of Administrative Sciences Speyer is the first University to start to apply an

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38   Note that these modules are developed and not all of them are available yet from the ICDL foundation. The authors considered only those available.

39   Cf. https://bildungsgutschein.kursportal.info/g170

40   Cf. https://egov-campus.org/projekt/beschreibung. Like many ICT-related official websites in Germany it is unfortunately available in German language only.

Studies •

on-Campus program to teach a selection of eGov-Campus Modules in a hybrid manner, so that these courses are taught partly in presence lessons.

CONCLUSION

e-Government in Germany lags heavily behind its peers and even far less developed countries. We believe one of the main reasons for this situation is that ICT is terribly neglected in those universities and institutions that provide Public Administration tertiary education. This is either because of ICT skills need not be taught due to individual Federal State regulations or, if a regulatory element, are neglected by the universities. Such inadequately trained staff, which simply has "average John Doe ICT skills", cannot be expected to digitise the public administration.

The authors recommend two measures to be implemented immediately, first the mandatory introduction of the approved ICDL as a quick fix and, in the medium run, a streamlining and standardisation of e-Government training by deepening and widening the existing e-Government Campus. And, furthermore, making the use of the modules and materials developed in the e-Government Campus mandatory.

The current situation of little and non-unified syllabi is definitely not satisfying and, highly likely, one of the main reasons why we have such a situation with German e-Government.

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