# DESIGN OF LEARNING AND TEACHER EDUCATION IN GERMANY AND JAPAN

## CURRENT TRENDS AND DISCUSSIONS

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# CONTENTS

Kobe City, Japan

# INTRODUCTION

Different pathways into the teaching profession, current priorities in research on teaching and teacher education, social challenges for school and teacher education: which differences and similarities regarding these issues manifest between Japan and Germany? How can we learn from each other while shaping efficient systems of teacher education?

These questions were central to the German-Japanese workshop Design of Learning and Teacher Education in Germany and Japan taking place at University of Kobe's Faculty of Human Development from September 5th to 6th, 2018. This workshop on educational science was part of the Second Interdisciplinary and Research Alumni Symposium iJaDe 2018, which was funded by the Alexander von Humboldt Foundation as well as by the Excellence Initiative of the Federal Government and the federal states, and has been organized by TU Dresden, in conjunction with Kobe University, Kyoto University and Osaka University.

The cooperation between TU Dresden and the universities in the Kansai region has already been existing for several years with a focus on science and mathematics. This year for the first time, researchers from psychology and educational sciences were participating in a joint event.

During the last years, there have been first contacts and mutual visits between TU Dresden educational researchers and colleagues from Kobe, Kyoto, Tokyo and other sites. Now, this German-Japanese network has been expanded. The main goal of the joint workshop was to give each other a broad overview on current trends and discussions in the field of educational research in both countries with a focus on teacher education.

The TU Dresden delegation mostly consists of participants of the project TUD-Sylber, a major project for the improvement of teacher education funded by the German Federal Government. The involved scientists gave an insight into their activities and presented selected didactic developments and results of empirical research on a wide range of issues: Science Education, Mathematics Education, Civic Education, Standards of Teacher Education, Internships in Teacher Education and Interactive Learning.

In comparison, researchers of several Japanese universities (Kobe University, Tokyo Gakugei University, Kobe College, Shimane University, Hyogo University of Teacher Education,

Konan Women's University) presented results on the same topics and research questions by working in binational tandems.

Despite all the differences between Japanese and German systems of school and teacher education, academic discussions as well as discussions concerning university didactics have proven thoroughly compatible.

Regarding primary school didactics (Prof. M. Schütte, TUD-Sylber/ Prof. Y. Okabe, Kobe University), a mutual interest in processes of collective learning in the mathematics class-room became visible. Based, among others, on examples from physics and biology di-dactics, Prof. G. Pospiech (TUD-Sylber) and Prof. S. Miyake (Kobe College) illustrated the potential of extracurricular learning environments for subject teaching and interdisciplina-ry learning. Prof. A. Besand (TUD-Sylber) and Prof. J. Yoshinaga contrasted the German and Japanese concepts of political education and discussed current challenges. The presen-tations of T. Bauer and Prof. A. Gehrmann (TUD-Sylber) as well as those of Prof. J. Besso und Prof. N. Nagasawa (Hyogo University of Teacher Education) examined the character and concept of school internships absolved during studies and shined a light on students' teaching experiences and acquisition of competences. Under the heading Interactive Learning, Prof. S. Narciss discussed the impact of interactive learning environments.
Prof. Y. Kato, Prof. Ito and colleagues highlighted the impact of cooperative learning on the well-being of pupils.

For some of the binational tandems, the workshop in Kobe probably marked the beginning of long-term cooperations.

Besides the binational exchange, the very heterogenous field of participants regarding nation, scientific discipline, research focus and methodical approach has contributed to a fruitful discussion. The approach of TUD-Sylber – bringing together institutional players from different areas of teacher education in order to search for similarities, overlappings, and synergies – has also proven successful in an international context.
Japanese and German participants gained ideas on how to deal with challenges in school and teacher education, both countries are facing in a similar way.
The workshop constituted an important milestone in terms of the internationalization of research on teaching, school, and teacher education at TU Dresden.

The present booklet provides a brief insight in the lectures held in Kobe.

# TUD-SYLBER – SYNERGETIC TEACHER EDUCATION

The project, which is funded by the Federal Ministry of Education and Research, aims to improve the quality of teacher training at the TU Dresden. All this is part of a quality improvement plan calling for institutional and content-related changes on both federal and state level (Qualitätsoffensive Lehrerbildung des Bundes und der Länder). The project's main objective is to create better means of communication between everyone involved in teacher training – both within various faculties of the TU Dresden and beyond the university's faculties. Thus, improvement can be brought about as people get connected more easily while working on new ideas in the field of teacher training.

TUD-Sylber brings together experts of six different faculties and the Centre for Teacher Education and Educational Research. Working together, these experts take a closer look at the institutional structure of teacher training at the TU Dresden and other contents and methods which are used to train teachers at university. As a result, several aspects of teacher training may be improved and promoted, such as the quality of student counselling, course organisation in general, and the idea that teacher training should have a strong emphasis on practical skill development and research. TUD-Sylber's main emphasis lies on three aspects that are all inextricably linked with each other: the improvement of organisational development, quality improvement, and regional networking.

Focus Organisational Development — Focus Quality Inprovement — Focus Regional Networking

**3 FOCUSES**

| Organisational Development | Quality Inprovement | Regional Networking |
|---|---|---|
| Setting up an Academic Affairs Office for Teacher Training at ZLSB | Training of Teaching Routines / Heterogeneity right from the Beginning | Learning Environment Saxony: Learning at Out of School Facilities / Learning Environment Saxony: Learning at Out of School Facilities |
| Setting up a Graduate Forum at ZLSB | Teaching, Learning and Researching in Workshops / Heterogeneity in Teaching at Vocational Schools | Info-Scouts |
| Project Management and Project Development | Classroom Videography / Teaching Multi-grade Classes | |
| | Didactic Perceptions / Professional Taskbased teaching | |
| | Lesson Patterns in Interships | |
| | Key Issues in Society | |

**PACKAGE OF 16 SUBPROJECTS**

# WORKSHOP PROGRAM

## INTRODUCTION

| 10:00 am | *Welcome Address* | Prof. Takanobu Watanabe *Kobe University* |
|---|---|---|
| 10:15 am | TEACHER EDUCATION IN GERMANY – AN OVERVIEW | Prof. Axel Gehrmann *TU Dresden* |
| 10:45 am | TEACHER EDUCATION IN JAPAN – AN OVERVIEW | Prof. Kenjii Maehara *Tokyo Gakugei University*, Prof. Takanobu Watanabe *Kobe University* |
| 11:15 am | *Discussion* | |
| 11:30 am | *Presentation of the Workshop Program* | Rolf Puderbach *TU Dresden* |

## SCIENCE EDUCATION

| 11:45 am | TEACHER PREPARATION FOR IMPLEMENTING INTERDISCIPLINARY LEARNING ARRANGEMENTS AT OUT-OF-SCHOOL PLACES WITH FOCUS ON PHYSICS | Prof. Gesche Pospiech *TU Dresden* Florian Simon *TU Dresden* |
|---|---|---|
| 12:15 pm | SHORT COMMUNICATION BUT BIG IMPACT: HOW A PICTURE STORY HELPS YOUNG PEOPLE TO LEARN ABOUT ENDANGERED SPECIES | Prof. Shiho Miyake *Kobe College* |
| 12:45 pm | *Discussion* | |
| 1:30 pm | *Lunch break* | |

## MATHEMATICS EDUCATION

| 2:30 pm | COLLECTIVE LEARNING IN PRIMARY SCHOOL MATHEMATICS LESSONS | Prof. Marcus Schütte *TU Dresden* Ann-Kristin Tewes *TU Dresden* Judith Jung *TU Dresden* |
|---|---|---|
| 3:00 pm | STUDY ON ASSOCIATION OF "THE TALKS OF CHILDREN" AND "THE CONSTITUTION OF THE MATHEMATICAL KNOWLEDGE" | Prof. Yasuyuki Okabe *Kobe University* Takato Shimomura *Shimane University* |
| 3:30 pm | *Discussion* | |

## CIVIC EDUCATION

| 4:15 pm | THE ROLE OF TEACHERS IN DEVELOPING STUDENT CIVIL COMPETENCY AND HOW THIS IS REFLECTED IN TEACHER TRAINING PROGRAMS | Prof. Anja Besand *TU Dresden* Tina Hölzel *TU Dresden* |
|---|---|---|
| 4:45 pm | THE ISSUES OF CIVIC EDUCATION IN JAPANESE SCHOOL | Prof. Jun Yoshinaga *Kobe University* Keiko Suga *Kobe University* |
| 5:15 pm | *Discussion* | |

## INTRODUCTION

| 10:30 am | STANDARDS FOR TEACHER EDUCATION IN GERMANY | Rolf Puderbach *TU Dresden* |
|---|---|---|

## INTERNSHIPS IN TEACHER EDUCATION

| 10:45 am | ASSISTED TEACHING OF STUDENT TEACHERS IN INTERNSHIPS: DESCRIPTION OF TEACHING PRACTICES AND REFLECTION OF TEACHING EXPERIENCES | Prof. Axel Gehrmann *TU Dresden* <br> Tobias Bauer *TU Dresden* |
|---|---|---|
| 11:15 am | REFORM OF PRACTICE TEACHING COURSES AND GROWTH OF STUDENT TEACHERS: IDENTIFYING ACHIEVEMENT GOALS BASED ON TEACHER TRAINING STANDARDS | Prof. Junji Besso <br> *Hyogo University of Teacher Education* <br> Prof. Noriyasu Nagasawa <br> *Hyogo University of Teacher Education* |
| 11:45 pm | *Discussion* | |
| 12:15 pm | *Lunch break* | |

## INTERACTIVE LEARNING

| 1:15 pm | EMPOWERING SMART LEARNING THROUGH INTERACTIVE LEARNING TASKS AND FEEDBACK STRATEGIES | Prof. Susanne Narciss *TU Dresden* <br> Julia Rose *TU Dresden* |
|---|---|---|
| 1:45 pm | DOES EMPOWERING INTERACTIVE LEARNING THROUGH THE COLLABORATIVE LEARNING SCHOOL SYSTEM PROMOTE STUDENTS' WELL-BEING? | Prof. Yoshiko Kato *Kobe University* <br> Miyuki Uemura *Kobe University* <br> Yiran Wang *Kobe University* <br> Prof. Atsushi Ito *Konan Women's University* |
| 2:15 pm | *Discussion* | |

## SUMMARY

| 3:00 pm | CLOSING REMARKS | Prof. Axel Gehrmann *TU Dresden* |
|---|---|---|
| 3:30 pm | *Final discussion* | |

# TEACHER EDUCATION IN GERMANY – AN OVERVIEW

In the public discourse on teacher education in Germany, there is a constant change of trend topics that attract great attention in science, politics and media.

To give an overview of the priority topics of the current decade, the publications of the so-called Monitor on Teacher Education can serve as an indicator for the relevance of topics in the public discourse on education, school and teacher training.

The Monitor on Teacher Education is a special service driven by four major foundations on Education and Science. It collects data, distributs information and shapes the public discourse in Germany.

Since 2012, nine reports/reviews on focus topics were published on the following issues:



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- Digitisation
- Inclusive schooling
- All-day-schooling
- Practical relevance of teacher training
- Recruitment of teacher students
- Organizational patterns of teacher education at universities
- Mobility of teachers between the federal states
- Shortage of teachers for vocational schools
- Teacher Quality Campaign

In 2015, the German Federal Ministry for Education and Research published the funding guidelines for the Teacher Training Quality Campaign. The campaign meets the current challenges facing the teaching profession and aims to modernise and adapt teacher training to new demands. The main objectives of the funding programme are nearly congruent with the priority topics, the Monitor on Teacher Education dealt with. Teacher Training Quality Campaign provides incentives to improve teacher education at universities in the following issues:

1. Profiling and optimizing the structures of teacher training at universities (e. g. centres for teacher education / schools of education)

2. Quality improvement of the practical reference in teacher training

3. Improvement of the advisory services and student support services

4. Dealing with inclusion and heterogeneity as a topic of teacher training

5. Dealing with digitalization and new media as a topic of teacher training

6. Recruitment of students for STEM subjects

7. Closer networking of scientific disciplines, didactics and educational sciences

Since 2016, about 50 German universities committed themselves to the sustained improvement of teacher training according to the named objectives. This is a massive impulse for the design of study programme as well as for the educational research in Germany.

References
https://www.monitor-lehrerbildung.de/web/ | https://www.qualitaetsoffensive-lehrerbildung.de/

# TEACHER EDUCATION IN JAPAN – AN OVERVIEW

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Teacher education in Japan today aims to enhance the qualifications and abilities of teachers throughout their lives based on the recognition that teacher training, employment and development should be reformed in an integrated manner. This presentation outlines the trends in teacher education in Japan from the following two perspectives: teacher training and teacher development (in-service teacher training).

## TRENDS IN TEACHER TRAINING

## GUARANTEE OF THE QUALITY OF TEACHERS

One of the biggest challenges in teacher training in Japan in or after 2000 is how to guarantee the quality of teachers who have been trained at various universities. What is expected to serve as a measure to guarantee the quality of teachers are the Teacher Training Standards, which indicate the minimum qualifications and abilities that students who aim to become a teacher must acquire by their graduation from university or college.

## TEACHER TRAINING CURRICULUM

In response to the report "Enhancement of the Qualifications and Abilities of Teachers Who Will Support the Future of School Education" submitted by the Central Council for Education in December 2015, the Education Personnel Certification Act was significantly revised in 2017. Consequently, all relevant universities are currently revising their teaching training curriculum to Foto Watanabecomply with the new standards.

## PROFESSIONAL SCHOOLS FOR TEACHER EDUCATION

Professional schools for teacher education have been established as a new teacher training system in graduate school education since 2008. Unlike conventional graduate schools (master's course) that focus on research, professional schools for teacher education are graduate schools (professional degree course) specialized in fostering teachers as highly skilled professionals.

## TEACHER SCHOOLS

The establishment of teacher schools is one of the recent trends in teacher training. The independent efforts of boards of education to foster and commit excellent teachers before they are employed as teachers have become widespread throughout the country. Various discussions are often held on teacher schools. The spread of teacher schools can be said to raise fundamental questions regarding the purpose of teacher training conducted at universities.

## OVERVIEW OF IN-SERVICE TEACHER TRAINING

The 2012 report of the Central Council for Education advocates the "Image of Teachers as Lifelong Learners". It requires that teachers should continue to learn in response to diverse problems that schools must confront. For this purpose, a lot of legislative and administrative measurement has been taken. As the newest measurement, the National Institute for School Teachers and Staff Development was established in 2017. It supports

the development of local governments' teacher training and also releases the standards of competencies that teachers should have. Taking into this standards, each prefecture also edits its own professional development plan for teachers. Both in Germany and Japan, school administration mainly arranges in-service trainings for teachers, often without official incentives, like as an advanced qualification or obligated renewal of their teaching certification. On the other hand, in the united states, for instance, in-service teacher trainings are mainly offered by universities and professional associations, and teachers take them in order to get some incentives. Currently, in Japan the discussion is evolving, how quality and effectiveness of in-service training can be reorganized, relieving the workload of teachers in the same time. What is important here is to develop a sustainable system for improving. A certain kind of administrative incentives for in-service teacher training might be considered in the near future.

Literature

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Topic area **SCIENCE EDUCATION**



### TEACHER PREPARATION FOR IMPLEMENTING INTERDISCIPLINARY LEARNING ARRANGEMENTS AT OUT-OF-SCHOOL PLACES WITH FOCUS ON PHYSICS

Everyday school learning takes place in an artificial environment: the classroom. To open up school for original experiences, out-of-school places can be visited. Many of these places outside school (e.g. museums) offer interdisciplinary learning arrangements covering various school subjects, so that they can be embedded in regular school learning. The main goal is to provide first-hand experiences permitting an intense perception of objects and intensifying the learning process. The visits break up usual patterns of teaching and support social interaction between students.

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By establishing so called out-of-school laboratories in Germany, great efforts have been made to increase interest and motivation of male and female pupils – especially concerning STEM-subjects (science, technology, engineering, mathematics) (see fig.1). Out-of-school laboratories enhance learning by enabling pupils to work on authentic problems of modern science and experiencing own scientific competency. Meeting real experts in science underlines the authenticity of the given task (Euler et al., 2015).

Research shows that out-of-school laboratories are indeed well suited to increase situational interest, intrinsic motivation and academic self-concept. They also enhance the image of scientists and of science-related jobs by giving insight into modern scientific research. However, in order to reach sustainable effects, additional aspects have to be considered: It is still an open question which aspects are most important for the positive outcome (e.g. laboratory features, the role of the tutors, ...) (Simon et al., 2018). Furthermore there are

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strong indications that for long term effects an explicit connection to learning at school is most important (Waltner & Wiesner, 2009). However, our experience shows that teachers often do not know how to use the advantages of an out-of-school learning place and how to embed the visit in regular lessons at school. Therefore it seems necessary to prepare pre-service-teachers, so that they are able to analyze the didactic potential of out-of-school places and to connect them to regular teaching at school.

At TU Dresden a corresponding interdisciplinary seminar was developed and carried out. In the seminar the teacher students visit a diversity of out-of-school places. Those include science museums, art museums, school-labs and parks or landmarks. These places are explored by a multi-perspective approach. Throughout the seminar a strong connection between theory and practice is maintained. The students study given examples, develop own ideas and test them with groups of pupils. The biggest challenge is to open the students' views in a way that they recognize different perspectives, deliberately reflect both of their subjects of study and cooperate with students of different subjects. The evaluation data show that students value how the seminar has broadened their view point towards interdisciplinary teaching and learning. They like the often completely new experience, but on the other hand find it difficult to keep the balance between the freedom of "just being outside school" and reaching certain learning goals. They often stress that a good preparation for visiting out-of-school learning places means much effort in addition to normal duties. Overall, the evaluation shows that the seminar is important and well suited to provide them with strategies on how to approach out-of-school places.
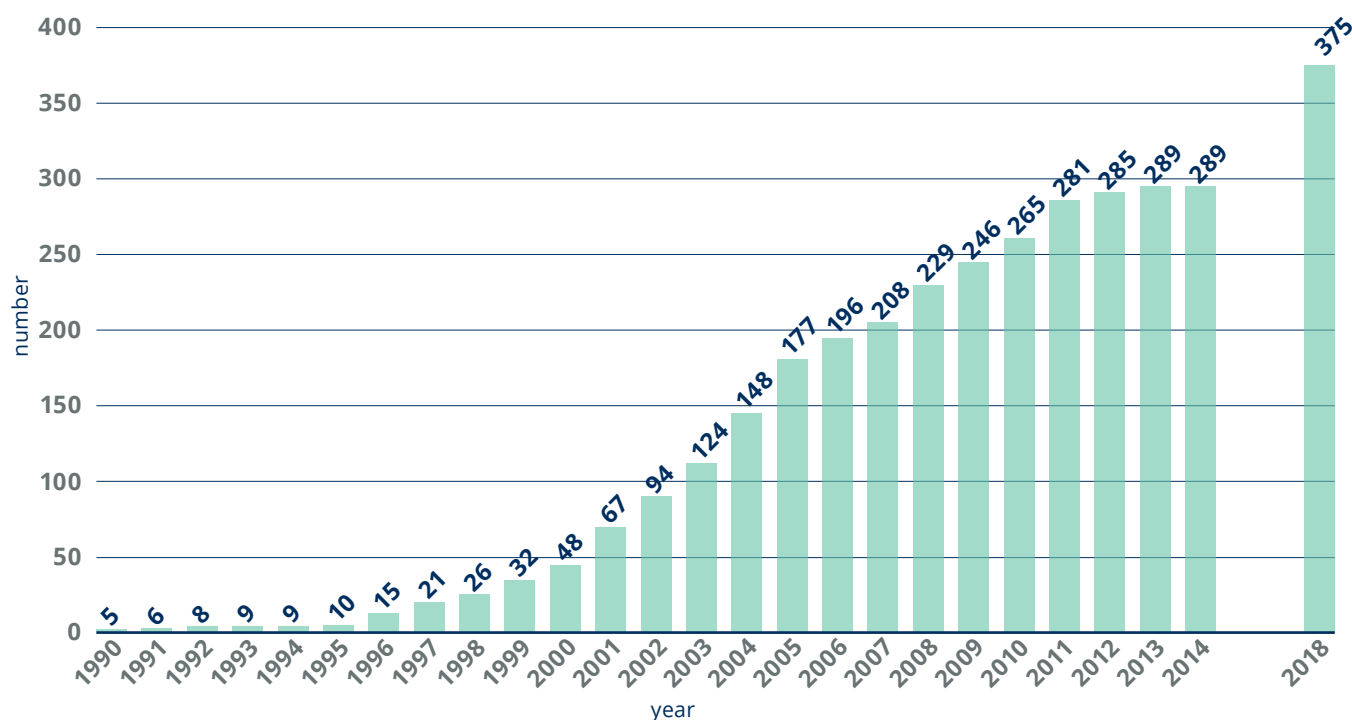


Figure 1: Development of number of out-of-school laboratories in Germany

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## SHORT COMMUNICATION BUT BIG IMPACT: HOW A PICTURE STORY HELPS YOUNG PEOPLE TO LEARN ABOUT ENDANGERED SPECIES

Conservation of endangered species is the most urgent task to be solved for the global environment. According to a government survey, nearly 20% of Japanese citizens reported they did not want to cooperate with threatened species conservation. To increase awareness about this critical issue and explain how the survival of threatened species relates to all citizens, it is necessary to develop accessible teaching materials. Therefore, my research group has developed a picture-story based on an endangered Asian elephant (Kato, Okuda, Fukumitsu, Kobayashi, & Miyake, 2015; Miyake, 2018). We focused especially on the relationship between wildlife and humans and included a perspective on the conflict.

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In this article, we consider two different delivery methods of this Asian elephant story. In the first case, we hosted a seven-minute storytelling event for visitors to the Tennoji Zoo. Impressions of the event were collected via multiple-choice survey from 74 participants. The second method used three minutes of digital video animation derived from the Asian elephant story. The animation was provided to 37 undergraduate students (18–19 years old). They watched it in a classroom and contributed their impressions through a word association survey.

The results of the survey collected at the storytelling event showed three perspectives of visitor impressions namely, emotional, cognitive, and overall aspects (Figure 1). With each aspect, the strength of the impression is clearly evident. For example, over 60 % of visitors responded tragic, sympathetic, and interesting as an emotional aspect. Approximately half or more selected international, environmental, and educational impressions as a cognitive aspect. Respondents generally thought this story was informative and interesting for adults as well as children.



**Emotional perspective**

| | | | |
|---|---|---|---|
| Joyful | 8.1 | 70.3 | Tragic |
| Indifferent | 5.4 | 82.4 | Sympathetic |
| Boring | 8.1 | 63.5 | Interesting |

**Cognitive perspective**

| | | | |
|---|---|---|---|
| Domestic | 9.5 | 63.5 | International |
| Social Issue | 16.2 | 48.6 | Environmental Issue |
| Enternaining | 9.5 | 75.7 | Educational |

**Overall / General perspective**

| | | | |
|---|---|---|---|
| For Children | 12.2 | 63.5 | For adults |
| Knew beforehand | 10.8 | 78.4 | Didn't know |

-80.0  -60.0  -40.0  -20.0  0.0  20.0  40.0  60.0  80.0  %

Figure 1: Multiple choice questions for zoo visitors

| Rank | Associate word | Response |
|------|----------------|----------|
| 1 | Sad | 27 |
| 2 | Pitiful | 22 |
| 2 | Cruel | 22 |
| 4 | Painful | 17 |
| 5 | Lovley pictures | 12 |
| 6 | Intelligible contents | 10 |
| 7 | Dark | 9 |
| 8 | Selfish people | 8 |
| 9 | Coexistence | 7 |
| 10 | Affectionate (care for 'Rani') | 6 |
| 10 | Environment | 6 |
| 10 | Value of knowledge | 6 |
| **Sub total** | | **152** |
| **Total** | | **318** |

**PERSONAL EMOTION**

**STYLE / TASE OF THE MOVIE**

**ETHICS / MORALITY**

**ENVIRONMENTAL ASPECT**

Table 1: Word association for undergraduate students

Table 1 shows the survey results for the digital video animation and the top ten response words used by the undergraduate students regarding the impact of the animation. These results can be grouped into four main student responses such as an ethical/moral aspect, an emotional aspect, an ecological aspect and a visual appearance aspect. It is believed that this presentation prompted students' consideration of the ethical, emotional, and ecological aspects of the issue, as well as evoked visual appreciation.

In sum, we delivered two kinds of presentations based on an Asian elephant to promote biodiversity conservation awareness. The demonstration time was only seven minutes and three minutes respectively, but each provided a powerful impact and effective motivation for their audiences from both a cognitive aspect and an emotional aspect.

Many more species are threatened with respect to human activity. Using this endeavour as a base, I hope to continue research in raising individual conservation awareness by focusing on other endangered target animals and exploring the effectiveness of different education methods.

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**MATHEMATICS EDUCATION**



## COLLECTIVE LEARNING IN PRIMARY SCHOOL MATHEMATICS LESSONS

Central to many approaches in the field of inclusive learning is the idea that learning itself takes place via mutual exchange processes among diverse children. In this context, an essential concept is represented by the idea of learning through difference. By addressing differences, and by interactively negotiating various perspectives, learning possibilities for different learners are expected to develop according to this idea.

Our theoretical-methodological access, which makes it possible to reconstruct such socio-cognitive conflicts, is represented by the interactionist approaches of interpretative classroom research (e.g. Bauersfeld et al 1988) – connecting sociological, interactionistic-constructivistic and subject-didactic theories of learning. Following these approaches learning mathematics is to participate in interactive processes of the negotiation of mathematical meaning. At the beginning of an interaction, participants draft first preliminary interpretations of the situation they are in. These individual definitions of situations take place in anticipation of possible attempted interpretations of other participants and in adaption to the other interpretations emerging from the interaction. Thus, a mutual alignment of individual definitions of situations takes place, which ideally leads to an interpretation that is taken as shared – a kind of working consensus. Through repeatedly generated working consensus in similar situations a person creates standardized and routinized definitions of the situation emerge which are called framings. Framings can be evoked by a person in similar situations again and again. Therefore, the individual's learning of mathematics can be seen as new construction and modulation of framings through interactions. Our qualitative analyses of the interactions of different student groups support the premise that opportunities for learning processes can arise insofar that children, due to their divergent framings, follow different approaches to solve a problem. In the interaction, these different approaches of the children have then to be explicitly negotiated what could lead to the construction and modulation of framings. Furthermore the results show that according to the compositions of the groups (e.g. groups with pupils with homogeneous or mixed achievement levels), children have to meet different content-related demands and different conditions of learning opportunities.

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This could be a motivation towards the formation of changing small groups in mathematics classes to foster different content-related competences  (Jung & Schütte 2018).

One aim of our TUD Sylber projects (JAMU/ HeLeA) is the development of concepts for teacher training which raise student teachers' awareness for different fields of heterogeneity in the school context. By means of an introduction to interactionistic approaches of interpretative classroom research students get sensitized to understand that in school very different individuals with diverse skills, experiences and wishes come together, that these diversity will lead to a multitude of interpretations and framings and that it is the task of the teacher to share this diversity of interpretations productively with other children. In practice the students develop and test learning environments, that generate opportunities for collective learning processes, during a research seminar and evaluate them by analysing the learning processes by using interactional analysis (Schütte et al. 2019).

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# STUDY ON ASSOCIATION OF "THE TALKS OF CHILDREN" AND "THE CONSTITUTION OF THE MATHEMATICAL KNOWLEDGE"

## INTRODUCTION

"Active Learning" is one of the keywords to attract attention in school education of Japan now. We work on implementing proactive, interactive, and deep learning improving classes from the perspective of active learning. However, it is a problem in class that "the purpose of talking" is lost for children and a teacher. It will be necessary to clarify "the talks of children" and to associate with "the constitution of the mathematical knowledge" in future.

## RESEARCH QUESTION

Nakahara (1995) said "Interaction (negotiation) with other people plays an important role to construct mathematical knowledge."
The relationship between "composition of mathematical knowledge" and "interaction (negotiation)" has been pointed out so far. The research questions are:

1        What are the characteristics of negotiations seen in discussion of elementary school math classes?

2        Can we clarify how "mathematical knowledge" is composed by negotiation?

## VIEWPOINT OF ANALYSIS

The following is a previous study conducted in Japan. In this issue, the percentage of Japanese children correct answers was 25%. The required mathematical knowledge is "Even for the same data, the shape of the graph is different depending on how to scale".
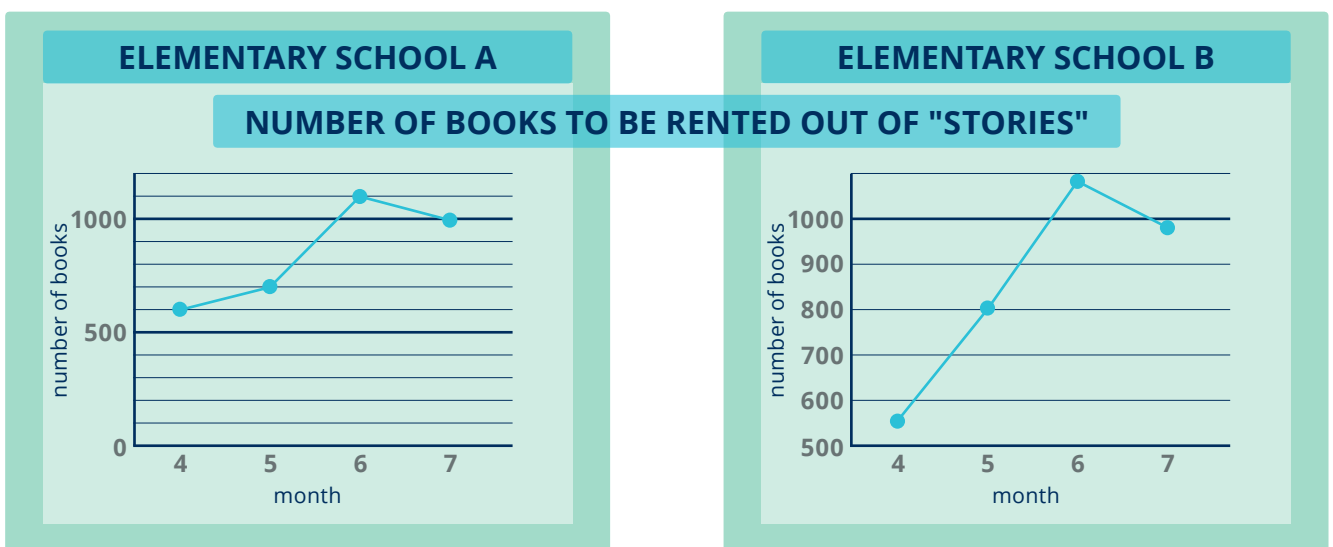
Analysis of language intent by Searle's speech act theory (1969) may be useful to capture negotiations that make up mathematical knowledge.

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### ELEMENTARY SCHOOL A

### ELEMENTARY SCHOOL B

#### NUMBER OF BOOKS TO BE RENTED OUT OF "STORIES"

> **Kenta**
>
> The gradient of the line is steep in B elementary school. Therefore, <u>the way of increasing the number of lending books of "stories" from May to June is larger in elementary school B than in elementary school A.</u>

[Question] The underlined part Kenta is saying is not right. Write the reason, using words and numbers.
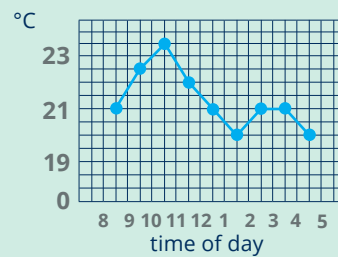
## METHODOLOGY

The data was taken from four classes of 28 Grade 4 students (ages 9–10) in one elementary schools in Japan. One class was extracted and an experimental lesson was carried out. We conducted a speech analysis that was seen in class.

**CHANGES IN AIR TEMPERATURE ON "A"**
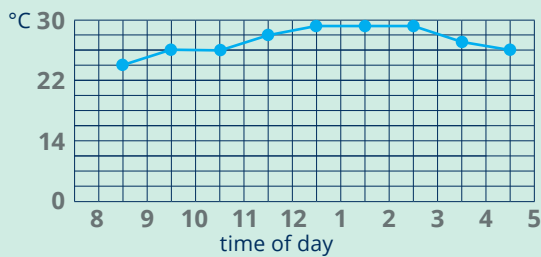
**CHANGES IN AIR TEMPERATURE ON "B"**

[Question] The graph below shows the temperature in Nara City during two days of June. Based on the two graphs, let us forecast the weather of "A" and "B". Also write down the reasons you expected.

## FINDINGS AND ANALYSIS

Tani's composition of mathematical knowledge

C (Tani): I thought that it was sunny if the line tilt was intense.

C (Hina): The temperature on "A" than the temperature on the "B" is better high. Therefore it is sunny on "A". Since one scale is 0.5 degree in "A" graph, the temperature seems to be intense.

C (Tani): Changes in temperature, "A" looked intense but "B" was more intense.

## DISCUSSION AND CONCLUSION

("Assert"→) "Request" → "Assert" → "Agree" is regarded as a process of negotiation in mathematics. While repeating interaction (negotiation), it turned out that Tani had mathematical knowledge (I understand that the shape of the graph will change depending on how the scale is taken).

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**CIVIC EDUCATION**



### CIVIC EDUCATION OR: DEMOCRATIC/ CITIZENSHIP EDUCATION IN SCHOOL AND TEACHER TRAINING

To understand how civic education in school and teacher training programs in Germany works, it is helpful to focus on three steps:

1 Analysis of Civic Education as a school subject with a very special history

2 Standards in the field of Civic Education

3 Teacher training program

Focusing on the first step: For the longest time, Civic Education was part of the German educational system. It was conducted both inside schools as well as outside formal school education. But it had for a long time been incorporated into other subjects and until the end of the Second World War, non-democratic concepts were predominant. Only after the collapse of the Hitler Regime in 1945 and the foundation of a new democracy in the western parts of Germany, an integration of an independent subject for Civic Education, which was clearly based on democratic values, had the chance to develop.

The history of the German Civic Education was characterized by dispute from the very beginning on. The most important and long-lasting question in the background of those debates is the question whether Civic Education should be a separate school subject or a cross-cutting issue. By looking at the German case, there is one lesson to learn. The only way to involve the schools in the process of democratization was to establish a separate subject for Civic Education. In the late 1960s and the 70s, the school subject was involved in the next conflict and controversies after the student movement and riots of 1968. On the one hand, some teachers decided to be part of the student movement and used Civic Education to convince their students to participate in this movement. Other teachers were strongly against it and used their teaching time to hold counter speeches. Civic Education became the plaything between the social bearings. The solution for this conflict leads to the second step because the only way to clarify this situation was to develop strong performance standards for Civic Education in schools, which are known under the term Beutelsbacher Consensus (Image 1). But in the field of Civic Education, there are two kinds of standards, which are Process and Performance Standards. Now coming from the Process Standards which focus on the question of how the process of teaching and learning should be organized, we are continuing with the Performance Standards. These standards are focussed on the results of learning. Performance standards describe which abilities students should develop in Civic Education processes: image 2.
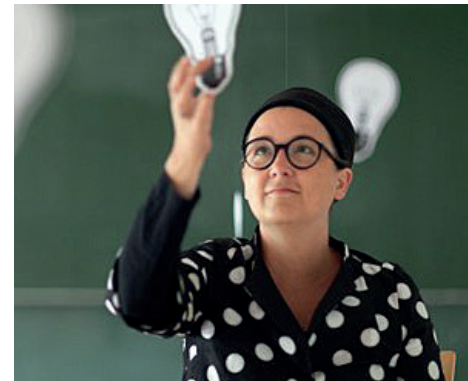


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## PERFORMANCE STANDARDS

Which ability students should develop | In the field of Cicic Education (2003)

| *Conceptual Interpretation* | |
|---|---|
| **Ability to make political judgement** | **Ability to act politically** |
| Political events, problems and controversies, as well as issues of economic and social developments, analysed and judged in a reflective way under factual and value aspects. | Formulate opinions, convictions and interests, represent them appropriately in front of other people, conduct negotitation processes and reach compromises. |
| *Methodical capabilities* | |
| Work independently on current political themes and orientate onself to economic, legal and social issues, handle specialist themes using different methods and organize one's further political learning. | |

Source_ GPJE (note5), p. 13.

## PERFORMANCE STANDARDS

Beutelsbacher Consensus (1976)

**1. Prohibition against overwhelming the pupil:**
It is not allowed to catch pupils unprepared or unawares – by whatever means – for the sake of imparting desirable opinions and to hinder them from forming an independet judgment'. It is precisely at this point that the dividing line runs between political education and indoctrination.

**2. Treating controversial subjects as controversial:**
Matters wich are controversial in intellectual and political affairs must also be taught as controversial in educational instruction. This demand is very closely linked with the first point above, for if differing points of view are lost sight of, options suppressed, and alternatives remain undiscussed, then the path to indoctrination is being trodden.

**3. Giving weight to the personal interests of pupils:**
Pupils must be put in a position to analyze a political situation and to assess how their own personal interests are affected as well as to seek means and ways to influence the political situation they have indentified according to their personal interests.

After this closer look at the core aims of Civic Education, it is necessary to question how teachers could be trained to implement all this in everyday school life. Researchers in the smaller field of didactics of Civic Education are confronted with the following task: Most of the students that arrive at the university ask for recipes of how to organize and act in class. This is highly understandable. But remembering the aims of the two standards, there arises a problem. Because if researchers want to empower emancipated, self-determined and mature future citizens there is the need to educate emancipated, self-determined and mature teachers. This is why it is not possible to offer recipes but training to identify, justify and reflect one´s own teaching strategies. Precisely we offer a biographical case study to help the students reflect their own experiences in school. Also very important is debating about current controversies and to offer open space where students have the right to follow their own interests. We also encourage divergent thinking to challenge the ability to find new solutions. All in all, it is important for us to give students the opportunity to develop self-determined priorities. Having said that, we of course also teach special courses on teaching methods or strategies to deal with standards. However, our central aim is to promote open-minded and mature teachers with a democratic attitude.

Thinking of the polarized society in Germany and all over the world Civic Education is not an easy task. But in the German case, there is no reason to fear indoctrination because Civic Education in Germany has developed high standards to avoid this. This does not mean that there is no normative frame for Civic Education. On the contrary, confronted with extremism, Civic Education needs to highlight human rights and constitutional foundations.

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## DEVELOPING SCHOOL LESSONS OF CIVIC EDUCATION FOR CULTIVATING ABILITY OF JUDGEMENT ON 'HUMAN FACTORS'

Voter turnout of Japanese young generation tends to be lower than that of the other countries. The voting age in Japan has been lowered to 18 years old in 2016. Under the above circumstances, many practices of civic education have been implemented for promoting young generation's involvement in politics.

Famous preceding lessons in Japan are making students compare manifestos of each political party and experience mock voting for cultivating ability of analyzing critically the policy of each party. In spite of those preceding lessons focusing on policy, a policy cannot be realized on its own in real politics. It can be executed and realized by human statespersons.

In the days of the 21st century, the world trend of politics is overwhelming populism. The distinctive feature of populism is not only people's preference to asserted policies of anti-elitism, opportunism, nationalism and racism, but also preference to persons who declare powerfully such policies. Therefore, democracy can be said to entail two risks; one is the risk of choosing erroneous policies and the other is the risk of choosing erroneous persons. So we insist the importance of taking not only the aspect of comparing the manifestos but also the aspect of choosing humans into the lesson of civic education. For this purpose, our presentation will provide a concrete lesson plan.

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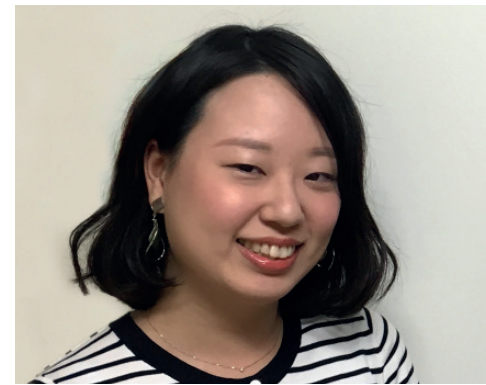
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First, we made a survey with 53 undergraduate students to clarify how such students decide on the voting actually. The reasons for investigating university students are the following. First, they are close to high school students' age who take civic education classes. Next, most of them are the age of experiencing elections. The survey found that students consider not only policies but also candidates' 'human factors' at their voting decision. Therefore, in addition to conventional lessons that carry out simulated voting after comparing policies of each party, lessons are needed in which students can experience the inclusion of 'human factors' into a voting decision and in which discussions can take place about 'human factors', statespersons should possess..

For cultivating the ability of judgement on 'human factors', we developed a lesson named 'Tsurukabuto District; a close constituency' which take both aspects of comparing the manifestos and choosing humans. In this lesson, we divided two students' roles; one is the type of emphasizing policy, another is the type of emphasizing 'human factors'. After the lesson, one student gave a review as follows, "Evaluation on policy and personality are both necessary as long as people do politics." Through this lesson, students could recognize the importance of judging 'human factors'.

For improving the lesson, at least, we need to revise its reviewing part so as to students are allowed to discuss about 'human factors' needed for statespersons. Additionally, we have a succeeding lesson plan in which the teacher explains populists' strategy and rhetoric (such as making enemies, oversimplifying policies, good/evil dichotomy, doubtful feasibility of policies, etc.), and students are said to review on their preceding mock vote experience, and after that, they discuss about needed statespersons' virtues once more.

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## STANDARDS FOR TEACHER EDUCATION IN GERMANY

The results of the international Student Assessment PISA evoked the so-called PISA-Shock in Germany. German pupils' performance was below the international average in some subjects. During the subsequent years, there has been an intense discussion about the quality of teacher education. As one result, nation-wide Standards for Teacher Education were defined by the Ministers of the 16 German federal states in the year 2004. These Standards describe the requirements for acting successfully on the job.

Four competence areas have been defined: Teaching, Educating, Assessment, Innovation. Each of these competence areas consists of several competencies. For every competence, detailed components are listed. These components are divided by the two stages of teacher training: What should teacher students know at the end of their studies? What should they have learnt at the end of the second stage of teacher education, the preparatory service in school?



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The purpose of these Standards is to have a clear orientation and guideline for teacher training programs. But looking on the curricula of the teacher training courses at German universities, it is obvious that 15 years after their publication, the standards are far from being completely implemented.

The results of an analysis of teacher training courses of universities throughout Germany show, that the competencies described in the Standards of Teacher Education are not covered very well by the curricula of the teacher training programs at the German universities.

While some competencies are part of the written curriculum of many universities (e. g. planning lessons), some competencies are rarely mentioned in the curricula (e. g. fostering values and norms).

A replication of this analysis for the curricula of TU Dresden teacher training courses for primary school, lower secondary school, Gymansium and vocational schools shows similar results.
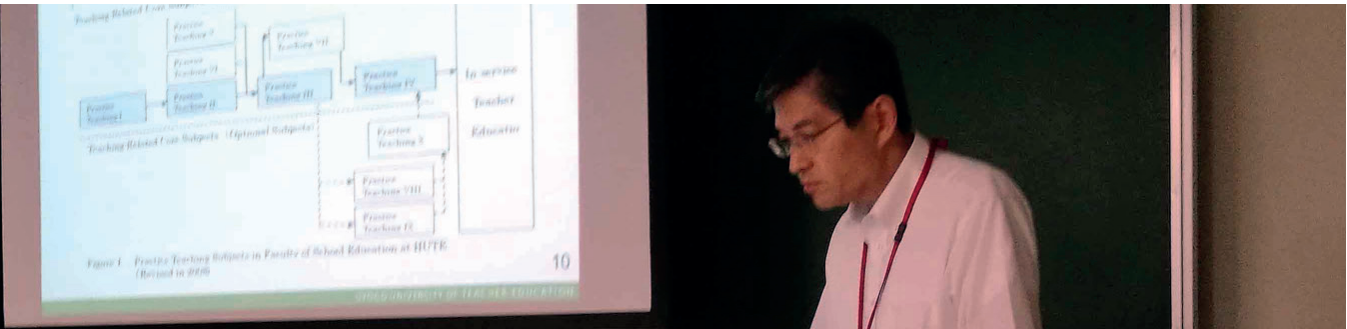
There is an emphasis on teaching and lesson planning in the teacher training programs, while Monitoring performance development is not really dealt with.

Obviously, there is no strong impact of the Standards on the Teacher Training programs at German universities, at least concerning the written study documents.

There is no massive trend toward standardization induced by the Standards. They provide orientation, but they are no binding regulation.

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### DESCRIPTION OF TEACHING PRACTICES IN THE CONTEXT OF ASSISTED TEACHING BY STUDENT TEACHERS IN PRE-SERVICE TEACHER INTERNSHIPS AT TU DRESDEN

One of the aims of the first stage of teacher training in Germany is to question and break with implicit teaching routines (e. g. Petrik, 2009) and link general didactic knowledge with the practice of planning and implementing teaching processes (KMK, 2014). As this is also one of the aims of Blockpraktikum A at TU Dresden (TU Dresden, 2016), we were interested in learning more about the teaching patterns our student teachers use in the context of this pre-service teacher internship. Blockpraktikum A is one of six pre-service teacher internships student teachers for middle schools and Gymnasiums have to do and the first in which student teachers at TU Dresden receive the task to plan, implement and reflect on at least two of their own lessons under real circumstances. To do this, our students spend about four weeks in a school after they have had an introductory course at university.

Our content analysis-based research focusses on the question, which teaching patterns dominate in the lesson plans that students write within their internship reports. We therefore developed a system of categories that is made up of every conceivable phase of a lesson. After coding each lesson plan into different phases, we concentrated on two middle phases: development and application. We distinguish between four different teaching patterns in the context of developing new knowledge: presenting, developing by demonstration, developing by questions and task solving. In all, we examined 62 of the 241 lesson plans in the internship reports, taking into account different school types and the five subjects our student teachers studied most often in March 2011.

In the context of performing lessons in Blockpraktikum A, our student teachers mostly have to deal with lessons where they should develop new knowledge. Fourteen out of 62 lesson plans contain lessons where students exclusively apply previously acquired knowledge. There are then five lessons that are either unrelated to the topic at hand or are not explicitly codeable (see Figure 1). To develop new knowledge, the student teachers mostly used the teaching pattern called developing by questions. Less frequently, the task solving teaching pattern was chosen. In any case student teachers mostly try to involve their students, although they do it in different ways (see Figure 2).
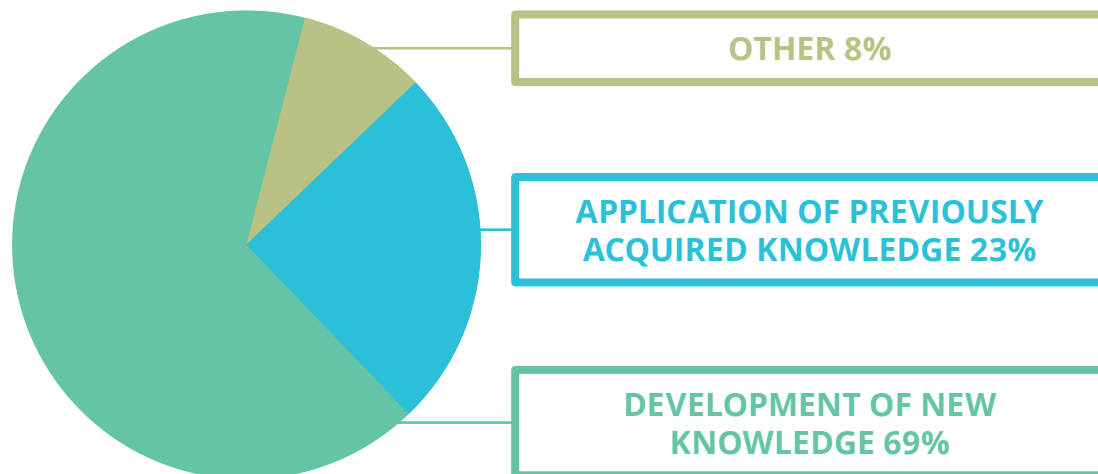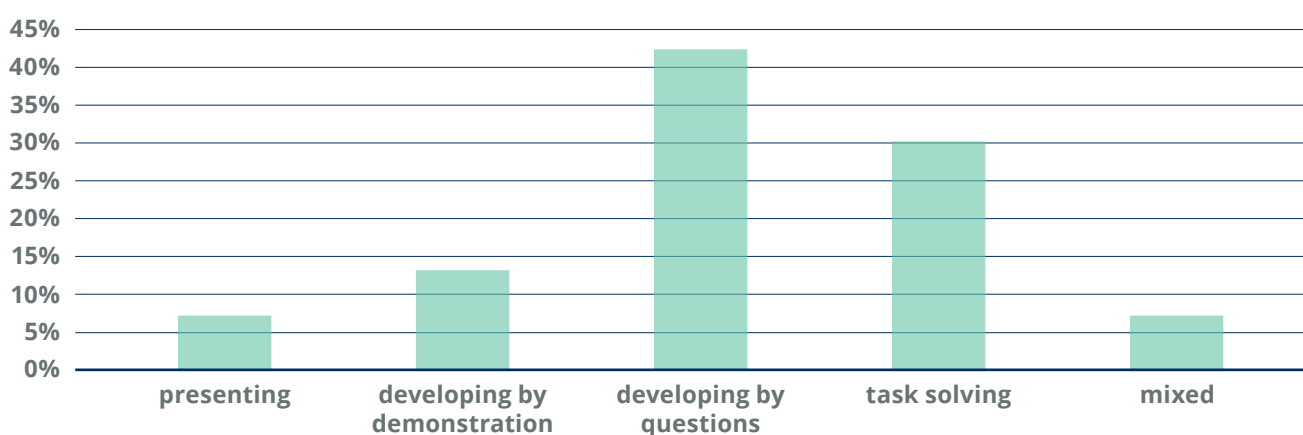
Figure 1: Kind of lesson



Figure 2: Teaching patterns for development

Comparing these data with research data about lessons of experienced teachers shows similarities. It seems to be problematic that student teachers may only practice teaching in ways they know from their own days as students or which they have seen in their internships without reflecting on them. This is why we have developed a seminar that deals with this issue. The seminar's main aim is to support the students, both in linking and reflecting on common and different teaching experiences in the context of their six pre-service internships. The seminar sessions are structured so that the students first discuss the students' individual cases and those cases of others in the group. The students then develop reflections that are based on scientific materials, theoretical concepts, and empirical studies. As the evaluation shows, our students seem to be satisfied and capable of undertaking theory-based reflection.

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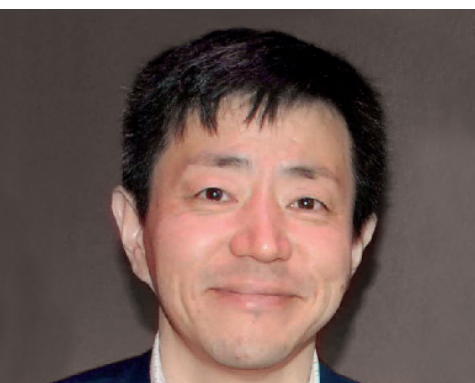
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## REFORM OF PRACTICE TEACHING COURSES AND GROWTH OF STUDENT TEACHERS: IDENTIFYING ACHIEVEMENT GOALS BASED ON TEACHER TRAINING STANDARDS AT HUTE

In Japan, it is a crucial issue to guarantee the quality of teacher education. Therefore it is necessary for teacher candidates to acquire basic abilities and competencies as teachers. Assuring the quality of student teaching programs would contribute to the accomplishment of such a goal. At Hyogo University of Teacher Education, the curriculum contains 'practice teaching courses' in each year between freshman and senior years in order to develop practical teaching skills among students (see Figure 1).
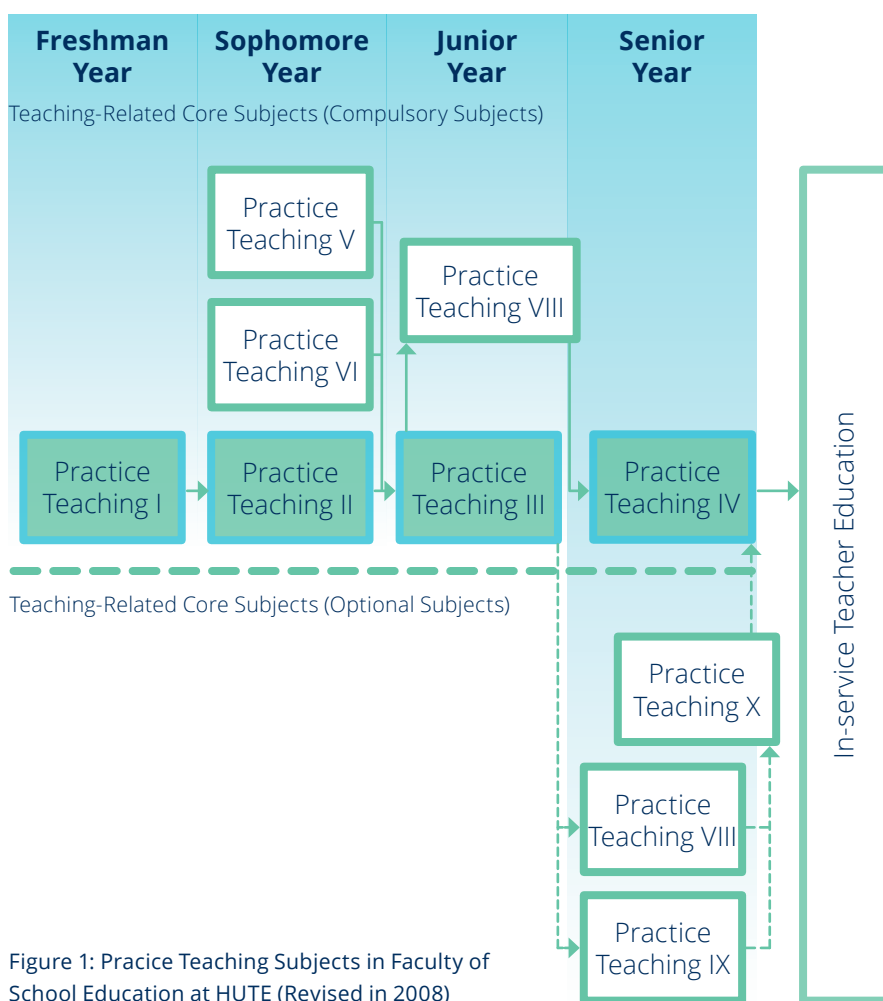


Figure 1: Pracice Teaching Subjects in Faculty of School Education at HUTE (Revised in 2008)

*Practice teaching 1* is done at the beginning of the freshman year. The students are asked to learn the meaning of the practice teaching and education at kindergarten, elementary school, and special school, and then observe those schools for one or two days. Through this course, they develop enthusiasm and prepare to become teachers.

*Practice teaching 2* is scheduled in the sophomore year as one credit course, participating in outdoor education activities, in order to observe students and understand them.

*Practice teaching 2* is 4 credits course, done in the junior year. For four weeks, the students learn education in the kindergarten or elementary school, acquiring basic skills and ped-

agogues in those schools, understanding characteristics of school-age or young children. Thus, they develop competences as teachers.

*Practice teaching 4* is 2 credits course, and the students go to their own kindergarten or elementary school they had graduated for three weeks. They will learn about young children or school-age children, their characteristics situated in the local communities. Through this course, the students develop more skills of teaching, enhance their competences, and become conscious about their responsibilities.

However, there had been no professional standards identifying the abilities and competencies necessary for becoming teachers, thus there had been no concrete achievement goals for each course of practice teaching. To resolve such gap in our curriculum, we had developed Teacher Training Standards and achievement goals for practice teaching courses, and conducted surveys for the students about how much their abilities and competences were formed through their coursework.

As a result, the achievement levels of practice teaching courses had been accomplished for freshman-, sophomore-, and junior-years students, but the senior-year students had not reached their expected levels. Therefore, senior-year practice teaching had been increased from 2 credits to 3 credits (2 weeks to 3 weeks for student teaching), so that achievement levels of senior-year students improved, and the items such as "mostly acquired" or "moderately acquired" were more frequently used for their evaluation. This result denies the former research which concluded that extending period of practice teaching is not effective, for example, work of Shibata in 1987 or Sato in 1999.

As a future challenge, we would like to investigate the reasons why the 3-credit program enhanced the evaluation of students' abilities and competencies. In particular, we would like to find out whether student teachers' learning or mentor teachers' instruction may be different, and whether there are differences in students' confidence or self-efficacy regarding their teaching practice because of extending the period of student teaching in the senior year.

Literature
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### EMPOWERING SMART LEARNING THROUGH INTERACTIVE LEARNING TASKS AND FEEDBACK STRATEGIES

Interactive learning tasks and interactive feedback strategies play a core role for smart learning in the 21st century. Based on models and empirical findings from research on self-regulated learning, a variety of joined functions can be elicited (see Figure 1): Firstly, learning tasks and feedback support learners in assessing task conditions and their prior knowledge. Secondly, they contribute to eliciting the learning goals and requirements. Thirdly, they provide occasions for applying, training, and monitoring learning tactics and strategies. Fourth, they are crucial for the evaluation of the learning processes and products. Fortunately, modern information technology allows designing a large variety of learning tasks and feedback strategies. Yet, designing and evaluating (computer-based) interactive learning tasks and interactive feedback strategies is challenging.
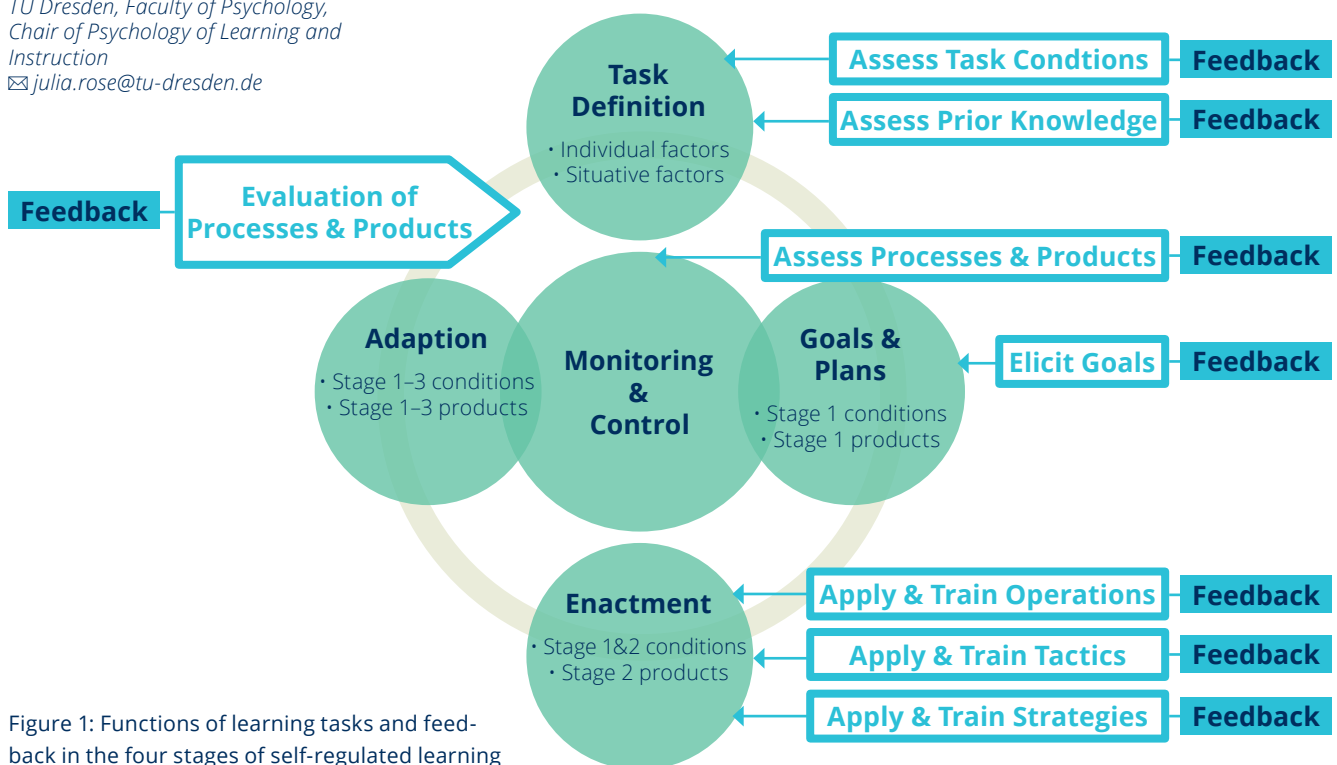


Figure 1: Functions of learning tasks and feedback in the four stages of self-regulated learning

Interactive learning task consist of a stimulus (e.g., an item stem) that requires learners to cognitively engage with the question or task provided in order to generate a response. In contrast to test-items interactive learning tasks offer not only response fields or options (e.g., multiple-choice options; gap-filling boxes), but also scaffolds students can access if they encounter obstacles in generating the response to the task (Proske, Körndle, & Narciss, 2012). To empower students as smart learners, interactive learning tasks need to be well-structured and provide just the right amount of instructional support. Findings of a study investigating the role of task-structure reveal that a high-level of task-structure has a positive impact on learners' motivation in terms of perceiving lower levels of cost regarding task accomplishment (Kisielski, & Narciss, 2018).

Interactive learning tasks can be combined with interactive tutoring feedback strategies (ITF). ITF-strategies combine elaborated formative feedback with tutoring and mastery learning strategies, i.e., they provide formative feedback that makes learners aware of important gaps existing between their current state of knowledge and their learning goal. Additionally, they provide assistive elaborated feedback (such as hints, explanations, or worked examples) that is aimed at tutoring students to detect errors, overcome obstacles or try more efficient solution paths. In doing so, interactive tutoring feedback strategies offer strategically useful information for task completion, without providing immediately the correct solution, and prompt the learner to apply this information to solve the learning task in the next trial. Furthermore, after successful task completion, they provide confirmatory positive feedback components (Narciss, 2017).

The design and investigation of ITF-strategies that involve the learner actively into the feedback process by prompting the generation of internal feedback before providing external feedback was illustrated by a recent study rooted in the Interactive Tutoring Feedback-Model (Narciss, 2017). The results indicate that combining internal and external feedback can be a powerful means of fostering not only performance and learning or problem solving strategies, but also learners' motivation. Interactive learning tasks and ITF-strategies also play an important role in cooperative and self-regulated learning in school contexts. Their design and implementation may have beneficial or detrimental effects not only on students' learning and motivation, but also on their well-being.

The effects of the factor of well-being on learning and motivation are further discussed in this conference transcript by the scientists M. Uemura, Y. Wang, Prof. A. Ito and Prof. Y. Kato.

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## LEARNING DESIGN AND WELL-BEING. DOES EMPOWERING INTERACTIVE LEARNING THROUGH THE COLLABORATIVE LEARNING SCHOOL SYSTEM PROMOTE STUDENTS' WELL-BEING?

Self-regulation functions play an important role in almost all fields of human behavior. The practical applications of self-regulation have promoted the study in many contexts, especially under the condition that it has been connected to school achievement such as better grades, more reading and social skills more than once Tangney et al., 2004; Eisenberg et al., 1997; Fabes et al., 1999; Duckworth et al., 2010. Recently, in our study, we identified that IKIGAI affected university students' self-regulation (Wang et al., 2018). IKIGAI is defined as Japanese originated well-being and composed of three factors "positive affect" "challenge" and "social role" (Imai et al.,2012). As mentioned, self-regulation is related to learning ability and we assumed that IKIGAI also has a positive effect on learning ability.

On the other hand, nowadays, teachers are encouraged to use collaborative learning methods in the classroom increasingly. The impacts of small-group collaborative learning have been examined and found that it is related to student achievement and positive attitude (Johnson et al. 1981, Roseth et al.,2008; Kyndt et al.,2013). "Positive Interdependence", "Face-to-face Promotive Interaction", "Individual Accountability/Personal Responsibility", "Interpersonal and Small Group Skills", and "Group Processing" were clarified as the necessary conditions of productive collaborative learning (Johnson et al., 1991). It is effective to build a collaborative learning school system, and practice collaborative learning both in and outside classroom based on these conditions. In the attached school of Kobe University, teachers focused on "group processing", and through this cooperative learning, students refrain their own support. For example, every student takes turns to be a leader of a small group, discuss about some topics and feedback from teachers or other students. It can promote students to be conscious of the relationship with friends, thereby achieving better performance, sharing their pleasure towards achievements, and being encouraged to positive behavior, just like the meaning of IKIGAI. Therefore, we surmise that IKIGAI (Well-being), collaborative learning and self-regulation ability affect each other and have a cause-and-effect relationship on both sides.

In future researches, the mechanize of IKIGAI (Well-being) and students' performance will be discussed, and we expect to consider how to make an effective use of IKIGAI in practices in attached school of Kobe University.
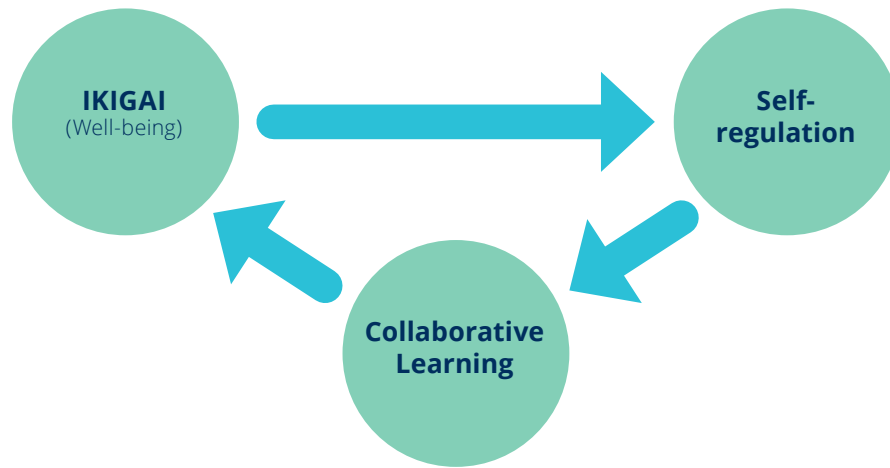
Figure 1: Interactive Process between IKIGAI(Well-being), Collaborative Learning and Self-regulation

References
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# DESIGN OF LEARNING AND TEACHER EDUCATION IN GERMANY AND JAPAN

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