

Your access to the course:

<https://seip.direct/#engelschall-SGX4-2FK4>



TUM course
**SOFTWARE ENGINEERING IN
INDUSTRIAL PRACTICE (SEIP)**
(IN2235) in WS25/26, in cooperation of



Prof. Dr. Florian Matthes
sebis chair, TUM
(Responsibility, Organisation, Exam)



Dr. Ralf S. Engelschall
SEA Software Engineering Academy gGmbH
(Teaching Assignment, Materials, Infrastructure)



Dr. Ralf S. Engelschall
msg Research, msg systems ag
(Teaching Assignment, Context, Experiences)

Please follow your lecturer Dr. Ralf S. Engelschall on LinkedIn to get in touch with him personally, and check out his writing activities on various technology and methodology topics, or his numerous Open Source Software activities like HUDS HUD Training and HUDS Pad you are working with during SEIP lecture.



YOUR LECTURE

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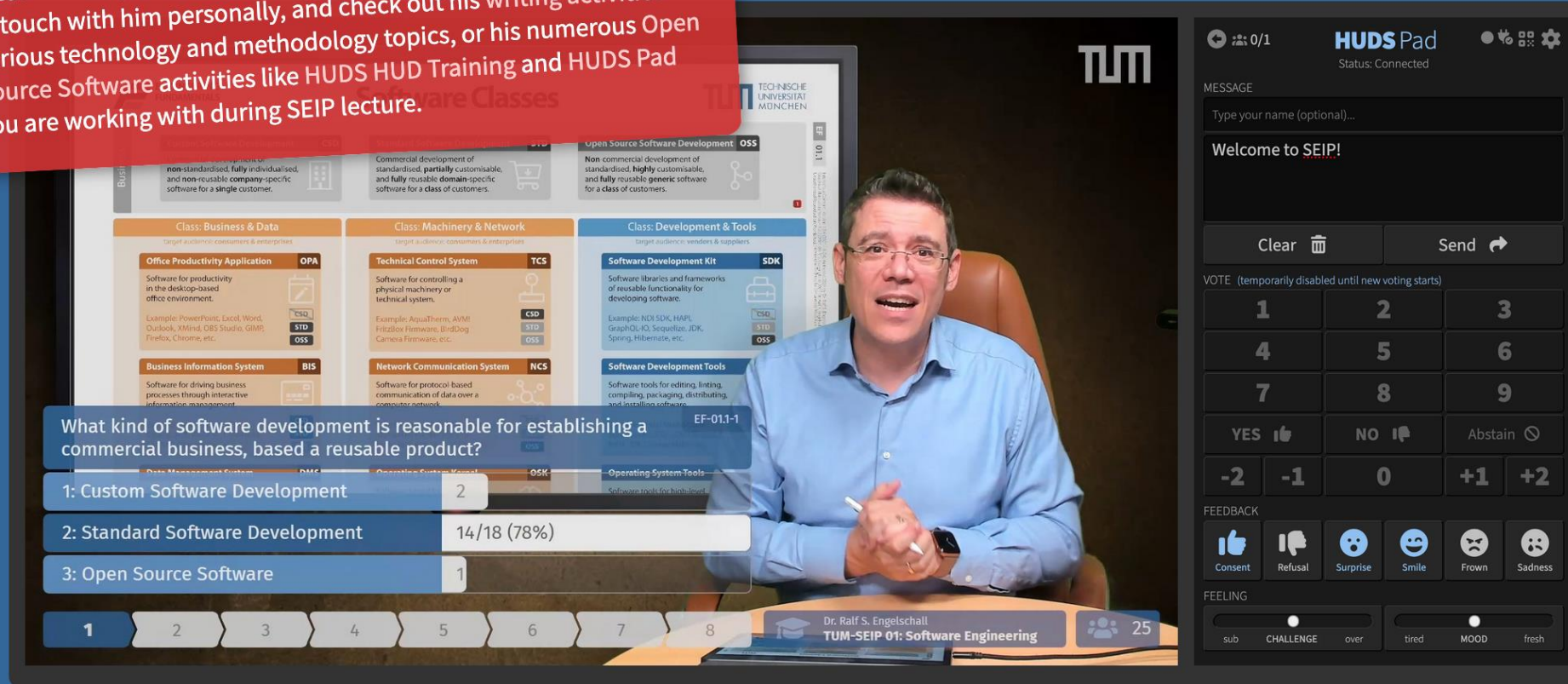


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The screenshot shows a lecture interface. In the center is a video of Dr. Ralf S. Engelschall, a man in a blue shirt, speaking. To his left is a presentation slide titled "Software Classes" with three columns: "Class: Business & Data", "Class: Machinery & Network", and "Class: Development & Tools". Each column lists software types and examples. To the right of the video is the HUDS Pad interface, which includes a message area, a voting section, and a feedback section.

Software Classes

Class: Business & Data	Class: Machinery & Network	Class: Development & Tools
Office Productivity Application (OPA) Software for productivity in the desktop-based office environment. Example: PowerPoint, Excel, Word, Outlook, Winmail, OBS Studio, GIMP, Firefox, Chrome, etc.	Technical Control System (TCS) Software for controlling a physical machinery or technical system. Example: AnsaTherm, AVMI, Fritzbox Firmware, UniDog, Camera Firmware, etc.	Software Development Kit (SDK) Software libraries and frameworks of reusable functionality for developing software. Example: NDK, SDK, HAP, GraphQL, JQ, Sequelize, JSP, Spring, Hibernate, etc.
Business Information System (BIS) Software for driving business processes through interactive information management.	Network Communication System (NCS) Software for protocol-based communication of data over a computer network.	Software Development Tools Software tools for editing, linting, compiling, packaging, distributing, and installation software.

HUDS Pad Interface:

- MESSAGE:** Type your name (optional)...
Welcome to SEIP!
- VOTE:** (temporarily disabled until new voting starts)
- FEEDBACK:** Consent, Refusal, Surprise, Smile, Frown, Sadness
- FEELING:** sub, CHALLENGE, over, tired, MOOD, fresh

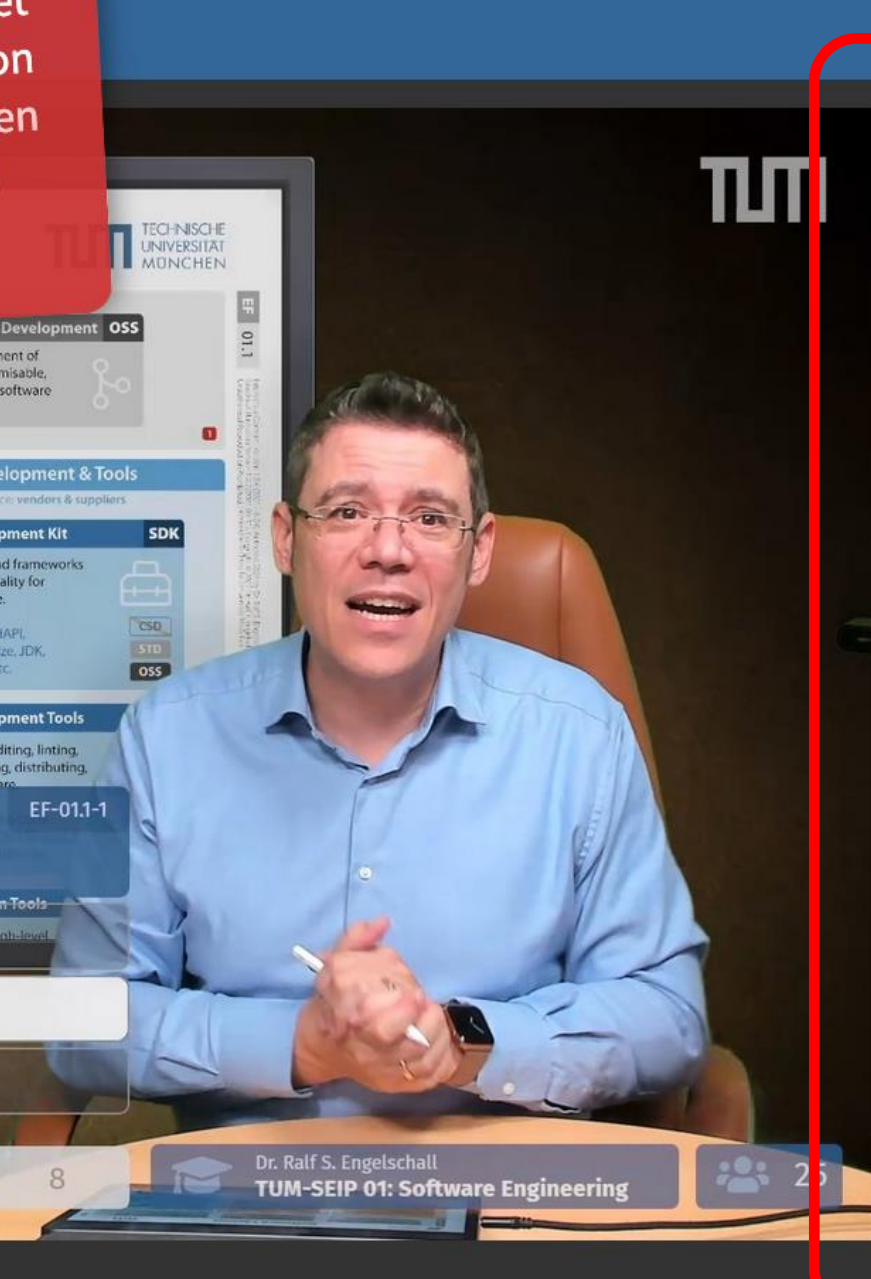
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0/1

HUDS Pad

Status: Connected

MESSAGE

Type your name (optional)...

Welcome to SEIP!

Clear

Send

VOTE (temporarily disabled until new voting starts)

1

2

3

4

5

6

7

8

9

YES

NO

Abstain

-2

-1

0

+1

+2

FEEDBACK

Consent

Refusal

Surprise

Smile

Frown

Sadness

FEELING

sub

CHALLENGE

over

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Open Source Software Development

- non-standardised, fully individualised, and non-reusable company-specific software for a single customer.
- Commercial development of standardised, partially customisable, and fully reusable domain-specific software for a class of customers.
- Non-commercial development of standardised, highly customisable, and fully reusable generic software for a class of customers.

Class: Business & Data	Class: Machinery & Network	Class: Development
Office Productivity Application (OPA) Software for productivity in the desktop-based office environment. Example: PowerPoint, Excel, Word, Outlook, XMind, OBS Studio, GIMP, Firefox, Chrome, etc.	Technical Control System (TCS) Software for controlling a physical machinery or technical system. Example: AquaTherm, AVM Fritzbox Firmware, AVMI, Carisma Firmware, etc.	Software Development Kit (SDK) Software libraries and frameworks of reusable functionality for developing software. Example: NDK SDK, HAPL, GraphQL, JQ, Sequencer, JCK, Spring, Hibernate, etc.
Business Information System (BIS) Software for driving business processes through interactive information management.	Network Communication System (NCS) Software for protocol-based communication of data over a computer network.	Software Development Tools (SDT) Software tools for editing, linting, compiling, packaging, distributing, and installing software.

What kind of software development is reasonable for establishing a commercial business, based on a reusable product?

1: Custom Software Development	2
2: Standard Software Development	14/18 (78%)
3: Open Source Software	1

1 2 3 4 5 6 7 8

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<https://multimediale-didaktik.de/>

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SoftwareClasses

Gegenüber: Die Lehrinhalte sollen stark fokussiert wahrgenommen werden.

Daher wird jedes einzelne Diagramm über einen Zeitraum von 20 bis 40 Minuten angezeigt und somit stark in den Fokus gerückt. Während dieser Zeit zoomen die Lehrenden per Gesteuerung auf dem Tablet in die verschiedenen Inhalte des Diagramms. Diese Methode des Zoomens ist inspiriert durch die Leinwand-Darstellungen bei der Präsentationssoftware Prezi (PREZ). Da bei jedem Zoom-Vorgang umgebende Anteile des Diagramms wieder sichtbar werden, werden die Studierenden regelmäßig an den Kontext und das Big Picture der Lerninhalte erinnert. Das ist ein nicht zu unterschätzender, wichtiger Vorteil gegenüber traditionellen Lehrmethoden.

Neben der Verwendung von Zooming annotieren die Dozierenden das Diagramm und dessen Inhalte „live“ während der Veranstaltung (Abbildung 9). Durch Zeichnungen und handschriftliche Ergänzungen lässt sich zum einen der Fokus verstärken, zum anderen ermöglichen sie, auch Zusatzinformationen ad-hoc einfließen zu lassen.

Zusammengelassen ermöglicht dieser Baustein eine neue Flexibilität in der Lehrdurchführung: Die klassische Folien nicht ersetzen, sondern vielmehr zeitlichen Gestaltungsfreiraum, und andererseits ermöglicht er es, auf Fragen oder Unklarheiten direkt einzugehen. Falls an einer Stelle inhaltlich zu tief eingegangen wurde, kann die darauf verwendete Zeit leicht an anderer Stelle wieder eingesetzt werden, indem dort wieder weniger tief auf die Inhalte eingegangen wird. In Summe kann durch diese Technik derselbe Lehrinhalt in unterschiedlichen Zeitvorgaben und Tiefen gelehrt werden.

Didaktik-Baustein 7/12: Content Zooming and Annotation

Das bewusste Zoomen auf wichtige Aspekte und die Möglichkeit zur interaktiven Annotation durch die Dozierenden in Diagrammen sind von großer Bedeutung. Unter den Schlagworten „death by PowerPoint“ und „after 24 slides per second it's a movie“ wird oft der heutige Trend von Präsentationen kritisiert, bei dem sehr viele, meist textlastige Folien in schneller Folge dargestellt werden. Dadurch verlieren die Teilnehmenden oft schon nach kurzer Zeit den Überblick. Diese Didaktik setzt explizit auf das

Diese Flexibilität ist auch besonders am Ende einer langen Lehrinheit von großem Wert. Gerade bei anstrengenden Ganztagsveranstaltungen in der Industrie ist es zweifelhaft, ob die Teilnehmenden sich zumindest die wichtigsten Lehrinhalte merken konnten. Deshalb wird üblicherweise gegen Ende noch einmal eine Zusammenfassung angeboten. Mit unserer Didaktik können die Dozierenden in den letzten 10-20 Minuten der Lehrveranstaltung an den Anfang zurückgehen und alle Diagramme der Lehrveranstaltung nochmals kurz vorstellen und somit in Erinnerung rufen. Dabei zoomen, annotieren und erwähnen die Dozierenden dann aber nur noch die wesentlichen Aspekte des jeweiligen Themenblocks.

Am Ende der Schulung exportiert man die annotierten Diagramme und versendet diese an die Teilnehmenden. Im Gegensatz zur Verwendung von expliziten Zusammenfassungsfolien ist hier ein hoher Wiedererkennungswert gegeben und die gelesenen Inhalte werden noch direkter gefestigt. Diese Art der Zusammenfassung erhielt über mehrere Jahre äußerst positives Feedback.

Didaktik-Baustein 8/12: Live Questions and Answers

Fragen des Publikums und die Möglichkeit zur Interaktion mit den Dozierenden sind wichtige Bestandteile jeder Lehrveranstaltung. Wie in Baustein 6 erwähnt, stellen wir den Studierenden den Video-Stream über ein YouTube Live Event bereit. Alternativ kann man die Lehrveranstaltung auch über eine Konferenz-Lösung wie Microsoft Teams, Zoom, Google Meet oder Jitsi Meet anbieten. Der Vorteil hierbei ist, dass die Studierenden neben der App-basierten Interaktion auch direkt mit den Dozierenden sprechen können. Allerdings findet diese Möglichkeit ihre Grenze bei einer größeren Anzahl an Studierenden.

Überraschenderweise zeigt die Erfahrung der letzten Jahre, dass die Teilnehmenden in der Industrie so gut wie gar nicht, und auch die Studierenden an der Universität nur in sehr geringem Ausmaß, das direkte Gespräch mit den Dozierenden suchen. Stattdessen bevorzugt die Generation Z vor allem die Möglichkeit eines schriftlichen Chats. Für den direkten sprachlichen Austausch wurde in erster Linie die ergänzende Sprechstunde genutzt. Der Grund für dieses stark veränderte Verhalten scheint einerseits die Sozialisierung der Generation Z über Social Media zu sein, andererseits aber auch darin begründet zu sein, dass man sich in einem schriftlichen Chat tendenziell sicherer fühlt — vor allem, wenn er die Möglichkeit für anonyme Fragen bietet.

Die psychologische Hürde ist bei schriftlicher Kommunikation also deutlich niedriger. Wenn man Interaktion und Fragen fördern möchte, dann ist der schriftliche Kommunikationskanal entscheidend. Deswegen etabliert dieser Didaktik-Baustein primär einen solchen schriftlichen Kommunikationskanal, auch wenn

zusätzlich auch ein traditioneller direkter Sprachkanal angeboten werden kann.

Der schriftliche Kommunikationskanal nutzt das bereits erwähnte Head-Up-Display (HUD) im Video-Stream und die zugehörige Client-Anwendung HUDS Pad, die direkt neben dem Video-Stream eingeblendet wird. Die Teilnehmenden können eine Frage im HUDS Pad formulieren und an die Dozierenden schicken. Deren HUD blendet die eingehenden Fragen links unten im Video-Stream ein (Abbildung 10) und erzeugt einen dezenten, aber gut vernehmbaren Hinweis.

Abbildung 8: Screenshot eines produzierten Video-Streams mit den verschiedenen überblendeten virtuellen und physischen Ebenen

Abbildung 9: Zoom und Annotation der Lehrinhalte für verstärkten Fokus während der Lehrveranstaltung

Abbildung 10: Eine eingegangene, schriftliche, anonyme Frage der Studierenden

Die Dozierenden werden dadurch nicht unterbrochen und können zunächst die aktuellen Ausführungen zu Ende führen. Danach können sie sich den eingehenden Fragen widmen. Wenn eine Frage beantwortet ist, blenden die Dozierenden diese Frage aus und wenden sich der in chronologischer Reihenfolge nächsten Frage zu. Dabei sind alle eingehenden Fragen gleichzeitig sichtbar, sodass man Überschneidungen leicht erkennen und die Antworten zusammenfassen kann. Zusätzlich werden die Studierenden animiert, sich ebenfalls mit der konkreten Frage auseinanderzusetzen, da sie bis zur finalen Beantwortung durchgehend sichtbar bleibt.

Dieses Vorgehen hat mehrere didaktische Eigenschaften: einerseits wird die bereits erwähnte psychologische Hürde, eine Frage überhaupt zu stellen, herabgesetzt. Andererseits gibt es weniger Verständnisprobleme aufgrund der Schriftlichkeit. Durch diese Maßnahmen ist eine hervorragende Interaktion zwischen Publikum und Lehrenden gegeben. Damit fällt der wesentliche Vorteil der Konferenzlösungen gegenüber einem Broadcasting weg, weshalb wir primär auf das latente Broadcasting-Verfahren YouTube Live Events setzen.

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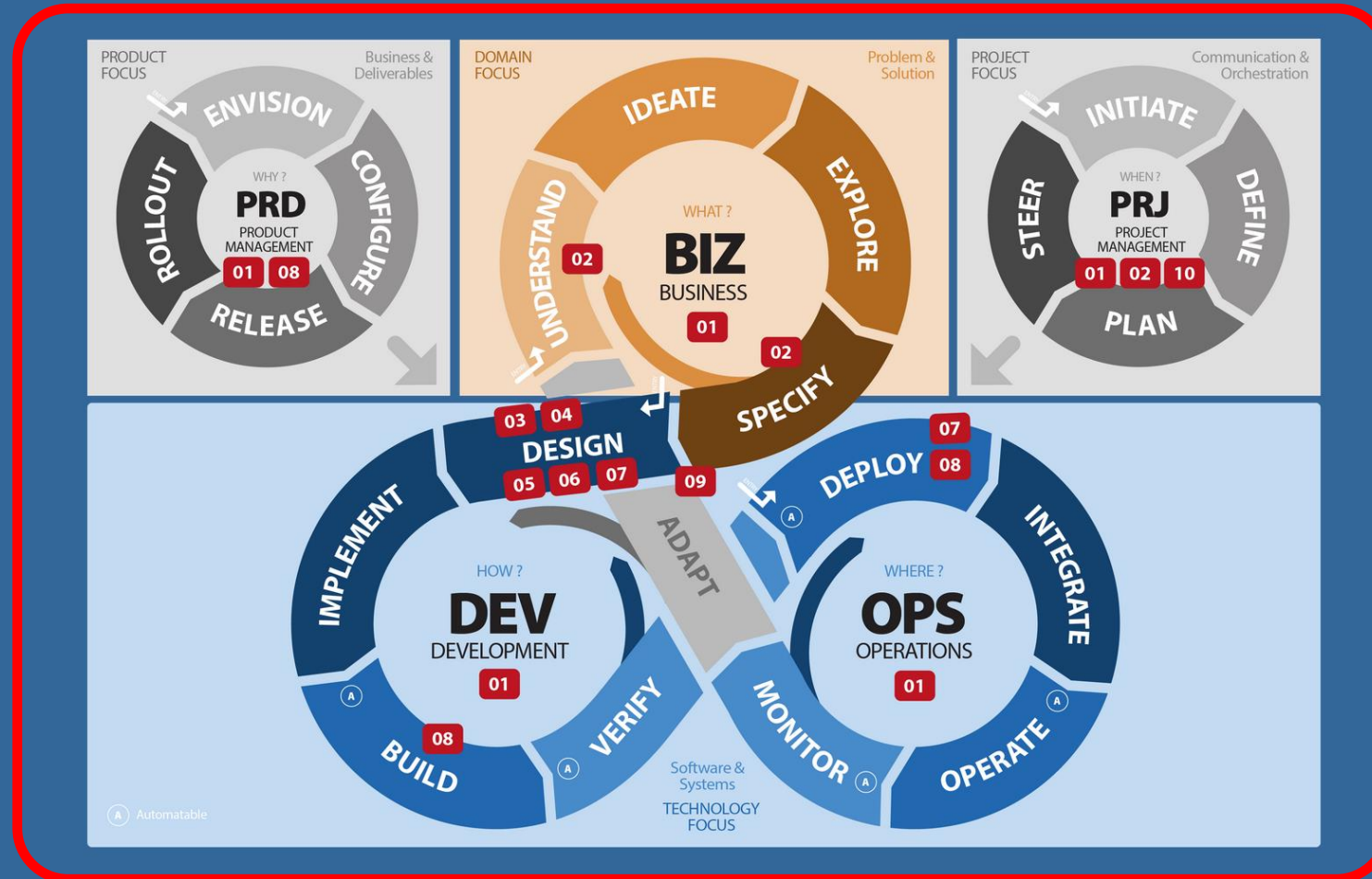
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engelschall-SGX4-2FK4



Thanks for entering the **ACCESS TOKEN** you received.
The links to the Online Events (see below) are now unlocked.

Your dates and materials for the Lectures
(performed online, primarily as YouTube Live Events and secondarily as Microsoft Teams Meetings)

Day	Date	Time	Name	Event	Materials
Thu				LECTURE (Teams)	AGENDA
Thu				LECTURE (YouTube)	AGENDA CONTENT SCRIPT (EN) SCRIPT (DE)
Fri				LECTURE (YouTube)	AGENDA CONTENT SCRIPT (EN) SCRIPT (DE)
Thu				LECTURE (YouTube)	
Fri				LECTURE (YouTube)	
Thu				LECTURE (YouTube)	
Fri				LECTURE (YouTube)	
Thu				LECTURE (YouTube)	
Fri				LECTURE (YouTube)	
Thu				LECTURE (YouTube)	
Fri				LECTURE (Teams)	
Fri				LECTURE (Teams)	

Your dates for the Consultation Hours:
(performed online as Microsoft Teams Meetings)
(please appear at the latest by 17:15!)

Day	Date	Time	Event
Thu		17:00-18:00	CONSULTATION HOUR (Teams)
Thu		17:00-18:00	CONSULTATION HOUR (Teams)
Thu		17:00-18:00	CONSULTATION HOUR (Teams)
Thu		17:00-18:00	CONSULTATION HOUR (Teams)
Thu		17:00-18:00	CONSULTATION HOUR (Teams)

Your
(perf

Exam:
sence)

Day	Time	Location
XXX	XX:XX-XX:XX	(Presence, XXXX.XX.XXX)

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erhält den Balzert-Preis 2023
für seinen herausragenden
Beitrag zur Vermittlung der
Informatik.

HEINRICH & HEINZ
BALZERT-PREIS



TECHNISCHE
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