

Teaching for Active Learning TAL2022



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Indholdsfortegnelse

Teaching for Active Learning TAL2022 Special focus: Developing student and graduate competences for the 21st Century.....	2
Anvendelse af Itslearnings testværktøj i fremmedsprogsundervisning	4
Production Pedagogy: Exploring the potential of aesthetic production in project work — getting started on thesis writing.....	11
An application of audience response system in a hybrid teaching environment based on Bloom’s digital taxonomy	16
Teaching creativity online – A curriculum and learning environment for upskilling Higher Education educators.....	22
Making reflective learning journals work.....	27
Teaching quantitative methods to social scientists: Motivation & Challenges.....	34

Teaching for Active Learning TAL2022

Special focus: Developing student and graduate competences for the 21st Century

In November 2022, SDU's Centre for Teaching and Learning (SDUUP) hosted its 10th Teaching for Active Learning conference. The main theme of the conference was active teaching and learning, which is the underlying principle for teaching at SDU. The aims of the annual TAL-conference are to provide opportunities for teachers, developers, and others with a special interest in teaching:

- to share, demonstrate, reason, and analyze their own examples of active teaching and learning
- to be inspired to develop one's own active teaching practice in order for students to learn actively.

The TAL conference provides an annual space for teachers and consultants to share their pedagogic discoveries, which in turn can inspire conference delegates' future practices. In addition to a variety of pedagogic discoveries, which activated students' learning and teachers' teaching, TAL2022 had a special focus on **Developing student and graduate competences for the 21st Century**. This prescient theme was introduced by the keynote speaker, Norman Jackson, Emeritus Professor, educator, writer, publisher and founder of '[Lifewide Education](#)' and '[Creative Academic](#)', who shared his own narrative and helped us understand his passion for lifewide learning. Developing our own and encouraging students to develop their own narratives, can help us identify our competences and our lifewide learning, which can sometimes be hidden from our view because they are so implicitly part of us.

Following Norman Jackson's keynote, delegates were introduced to SDU RIO's Learner for Life Model, designed to support teachers' and students' critical engagement with competence development. After an array of thought-provoking presentations, workshops, and posters, we wrapped up the conference with a panel discussion on competence development. The panel members included Norman Jackson, and SDU colleagues Caroline Schaffalitzky, Michael Petersen and Jannek Sommer, all of whom are involved with facilitating and leading on competence development within their study programmes.

And so TAL2022 concluded, leaving delegates with food for thought on how and why study programmes can embrace competence development for the 21st Century.

Read more about the keynotes in SDUUP's [Newsletter on TAL2022](#).

We are delighted to share with you TAL2022's conference proceedings and invite you to read more about a wide variety of ways in which teachers are activating their teaching and student learning as well as incorporating their experiences with online teaching into their courses.

Only a subset of TAL2022 presenters chose to subsequently write a paper or make a video on their presentation for this conference publication. In order to get a more complete overview of the

richness, diversity, and quality of the TAL conference contributions and presentations, we highly recommend that readers take a look at the [Book of Abstracts \(link\)](#) including:

- Detailed programme
- Abstracts on short communications, posters, and workshops

On behalf of the conference organizers

Rie Troelsen, Cita Nørgård, Donna Hurford
SDU Centre for Teaching and Learning

Developing inclusive and effective collaborative learning activities

Donna Hurford, Senior Pedagogical Consultant, SDU Center for Teaching and Learning, University of Southern Denmark

Andrew Read, Educational Consultant, London South Bank University

During the TAL2022 workshop 'Developing inclusive and effective collaborative learning activities' we actively engaged participants with a collaborative learning activity and then invited them to deconstruct the activity. The participants were asked to identify the perceived learning outcomes and the potential or actual biases in the learning activity's design and content. We concluded by offering the makings of a possible checklist for designing an inclusive and collaborative learning activity.

TAL2022 - Developing inclusive and effective collaborative learning activities

Developing inclusive and effective collaborative learning activities

OMG. This is SO boring!

How did I manage to abstain?

I know! Group work is the answer.

Mmm, there are a few assumptions to watch out for...

Wow! Group work is cool.

But is it really so straight forward? I'm not sure all students think group work is so cool!

Find out more at the TAL2022 workshop 13.00-14.15 Room 97

False consensus effect bias
"what I think is interesting is interesting to others"

Blind spot bias
"most students participated well in the activity therefore it's well designed"

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SDU LSBU

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Anvendelse af Itslearning's testværktøj i fremmedsprogsundervisning

Irene Simonsen, lektor, Institut for Medier, Design, Læring og Erkendelse, SDU Sønderborg

Inden for rammen *aktiverende undervisning og aktiv læring* præsenteres i det følgende en anvendelse af Itslearnings testværktøj på bachelorstudiet Bachelor of Science i International erhvervsøkonomi med fremmedsprog på SDU. Mulighederne for at optimere læringsprocessen og -udbyttet hos studiets tysksprogede studerende i deres tilegnelse af dansk som fremmedsprog undersøges. En forholdsvis begrænset samlet undervisningstid og en stejl progression fordrer aktivt selvstudium af de studerende imellem mødegangene, og det undersøges, hvordan Itslearnings testværktøj kan bidrage til denne aktivering. Efter en redegørelse for baggrunden for brugen af værktøjet, herunder en beskrivelse af læringsmål, gives der eksempler på brugen af værktøjet på to semestre, et første og et tredje semester, i efterårssemesteret 2021. Herpå følger de studerendes evaluering af anvendelsen af værktøjet, og afsluttende peges på nogle af de potentialer og begrænsninger, som værktøjet vurderes at have.

1. Baggrund og læringsmål

Ovennævnte danskundervisning kan overordnet karakteriseres som "meaning-focused instruction" (Carrió-Pastor 2016: 13), idet sproget som del af et økonomisk studie først og fremmest ses som kommunikationsmiddel. Samtidig er der tale om "Content-based language teaching" (Lyster 2017), hvor viden om dansk kultur og danske forhold formidles sammen med fremmedsproget. Da effektiviteten i en sådan tilgang kan trues af, at den sproglige form negligeres, og at fejlagtige former fossilerer, fordi de ikke korrigeres, foreslår Lyster (2017: 15-16) at balancere det indholds-baserede med det form-fokuserede ved at tænke undervisningen i fire indbyrdes forbundne faser: en "noticing phase" med fokus på indhold, en "awareness phase" og en "guided practice phase" med primært fokus på sprog samt en "autonomous practice phase" med fornyet indholdsfokus. Både det, at *noticing* er en forudsætning for *uptake*, altså optag af ny viden, og at *noticing* fremmes gennem gentagen eksponering, bekræftes gennemgående i anden læringsteori (fx Baars 1997: 304; Lindstromberg&Boers 2009: 17; Schmidt 2010: 735; Lindgren&Muñoz 2013).

Danskfaget på BSc. i International erhvervsøkonomi med fremmedsprog udgør 25 ects eller 3 ugentlige timer i 4 semestre, hvor det forventes, at de studerende bevæger sig fra et udgangspunkt med helt basale danskundskaber til et niveau, der svarer til den rutinerede sprogbruger, der forstår hovedindholdet i komplekse tekster og kan deltage nogenlunde flydende i en faglig diskussion (CEFR: A1-B2). Tidsmæssigt har de studerende knap 2½ time til forberedelse/efterbehandling af mødegangene. På den baggrund sås itsl-testene som et muligt redskab til at give de studerende ekstra eksponering for målsproget og anspore til træning af både *noticing*- og *awareness*processen, men også den styrede sprogproduktion (jf. Lyster 2017: 16).

I modellen i figur 1 (jf. Andersen et al. 2018: 34) illustreres i fire søjler den progression (nedefra og op), som finder sted inden for fremmedsprogstilegnelsen mht. færdigheder, strategier, sproglig viden og indhold.

Søjlerne er nært knyttet til hinanden, men følges ikke nødvendigvis ad i niveauerne, ligesom fx færdighederne ikke tilegnes konsekutivt. I anvendelsen af Itslearnings testværktøj var intentionen fortrinsvis at styrke det receptive, især lytteforståelse, som volder problemer for studerende på begynderniveauerne og er en øvelsestype, der kan stjæle rigtig meget f2f-undervisningstid, som er bedre brugt på mundtlig produktion og interaktion. I forløbene indgik dog også læsefærdigheds- og skrivefærdighedsøvelser.

Færdigheder	Strategier	Sproglig viden	Indhold
5 Skrivefærdighed	Procesorienteret skrivning	Sprogstruktur, morfologi, syntaks	Alle typer tekster, litterære, ikke-litterære
4 Mundtlig redegørelse	Mundtlig fremstilling, viden om struktur, emner, gloser	Viden om elementær morfologi og syntaks	Samfunds-, kulturelle og litterære emner
3 Læseforståelse (forstå skrevet sprog)	Læsestrategi (skimning, scanning, viden om tekstgenre, gloser)	Viden om teksttype, afsnit, sætning	Kendte samfunds- og kulturelle temaer
2 Samtalefærdighed	Kommunikationsstrategi	Viden om samtalers struktur, brug af vendinger (øer) og viden om scenarier	Nære og tilgængelige samfunds- og kulturelle temaer
1 Lytteforståelse (forstå talt sprog)	Lyttestrategi (gætte, forstå situation, gloser i situation)	Glosetræning, sproglige øer, viden om scenarier	Personrelaterede emner

Fig. 1. Andersen et al. (2018: 34): Progressionsmodel

2. Læringsaktiviteten: Eksempler på øvelsestyper

Fire af testtyperne på Itslearning kom i spil på de to semestre, nemlig *multiple choice*, *open answer*, *fill in the blank* og *match*-øvelser. På begge semestre var der skemalagt med 10 opgavesæt med 2-3 delopgaver i et sæt. Af dem skulle 8 være besvaret og vurderet godkendt som et led i fagets undervisningsdeltagelse. Itsl-opgaverne blev anvendt halvt sideløbende med, halvt integreret i tre "traditionelle" skriftlige assignments eller afleveringer.

Her gives et par eksempler på øvelser, der træner forskellige færdigheder og kan indskrives i Lysters fasemodel: Et eksempel på en *noticing*-opgave, som har betydningsfokus og træner lytteforståelse, herunder også evnen til interferens, er først følgende klip fra en multiple choice-opgave til et uddrag af en P1-udsendelse, "Arbejdsmarkedet forandrer sig" fra 2.8.2021 (figur 2).

Lyt, og markér det rigtige svar.

Synet på fleksibilitet har ifølge Janne Gleerup ændret sig, så det nu er arbejdstagerne og ikke længere arbejdsgiverne, der kan være interesserede i en vis frihed på den korte bane.

Synet på fleksibilitet har ifølge Janne Gleerup ændret sig, så det nu er både arbejdstagerne og arbejdsgiverne, der er interesserede i at mindske fleksibiliteten.

Synet på fleksibilitet har ifølge Janne Gleerup ændret sig, så det nu er arbejdsgiverne og ikke længere arbejdstagerne, der kan være interesserede i en vis frihed på den korte bane.

Fig. 2. Multiple choice-øvelse

Et eksempel på en *awareness*-opgave, som har formfokus, er følgende *fill in the blank*-øvelse. Øvelsen bevidstgør, gennem sit krav om gengivelse af hørte former, om ortografi og morfologi (figur 3).

Alexander Kragh fra Statum, et digitalt rekrutteringsbureau, fortæller i lydindslaget "O9. Arbejdsglæde" om 7 faktorer, der siges at have afgørende betydning for arbejdsglæde, nemlig mening, kollegaer, resultater, mestring, ledelse, balance og medbestemmelse.

Lyt til indslaget, og indføj de manglende ord i teksten.

Den syvende og sidste faktor, der spiller ind i jagten på arbejdsglæde, det er medbestemmelse på arbejdspladsen. Som menneske er det naturligt, at man gerne vil **inddrages**, at man gerne vil høres, og at ja, at man gerne vil have medbestemmelse på tingene. Hvis man konstant bliver **kørt** over og aldrig får lov til at sige sin mening, eller ens mening i hvert fald bare er for **døve** ører, så vil man ikke opnå arbejdsglæde.

Det var de syv faktorer, som spiller ind i, om man har arbejdsglæde eller kan opnå arbejdsglæde. Så **tænk** igennem, om de syv faktorer er til **stede** på dit arbejde. Det er jo ikke, fordi de allesammen behøver at makse ud på 10 ud af 10. De kan godt ligge på en, på en 9'er eller en 8'er eller en 7'er, og stadig kan du være fint **tilfreds** med dit arbejde. Men hvis en af dem helt **ludbliver** eller er helt nede og skrabe bunden, så bør du måske **overveje**, om du skal finde et andet sted at arbejde, eller om det er noget, som kan ændres på din nuværende arbejdsplads. Hvis det for eksempel er forholdet til din leder, kan du så gøre noget selv for at få et bedre forhold?

Fig. 3. Fill in the blank-øvelse.

Open answer-øvelser er blevet anvendt til den styrede sprogproduktion "guided practice", både i form af opgaver med betydningsfokus, som indholdsspørgsmål til videoklip, og i form af opgaver med det primære mål at bidrage til en nuancering og udvidelse af ordforrådet, som fx at finde synonymmer.

3. De studerendes evaluering af anvendelsen af testværktøjet

På begge semestre blev anvendelsen af testværktøjet evalueret vha. et spørgeskema, hvor de studerende havde mulighed for at vurdere sværhedsgrad, relevans, læringsudbytte og hvor u-/interessant, de havde fundet hver enkelt opgave. Ud over et evalueringsskema pr. øvelse var der plads til frie kommentarer. Her præsenteres et samlet, gennemsnitligt resultat af alle øvelser med antal studerende angivet i procent (i alt var der 18 førstesemesters og 26 tredjesemesters studerende, der evaluerede) (tabel 1, næste side).

1. sem.	0	1	2	3	4	5		3. sem.	0	1	2	3	4	5	
for let	-	7	29	25	13	26	for svær	for let	2	11	29	32	19	7	for svær
irrelevant	-	2	14	31	36	16	meget relevant	irrelevant	-	15	17	35	28	5	meget relevant
ikke lærerig	-	4	6	44	25	20	meget lærerig	ikke lærerig	-	13	15	34	32	7	meget lærerig
uinteressant	-	5	9	38	20	24	interessant	uinteressant	3	10	24	28	24	12	interessant

Tabel 1. Et samlet gennemsnitligt resultat af de to holds evalueringer i procenttal

Første semesters evaluering er gennemgående positiv ift. relevans, læringsudbytte og engagement, idet 44-52% krydser 4 og 5 af. Sværhedsgrad bliver ikke bedømt så entydigt positivt, idet 29% krydser kategori 2 af, dvs. øvelserne opfattes som "lidt for lette".

3. semesters evaluering er mere neutral end 1. semesters. Der er mellem 33-39%, der krydser 4 og 5 af ift. relevans, læringsudbytte og engagement. Flest vælger den neutrale hverken-eller-kategori 3 ift. alle spørgsmål.

Hvad der bedømmes positivt i kommentarerne, er 1) opgavernes integrering i de øvrige materialer i kurserne, 2) den variation, som opgaverne repræsenterer og 3) den umiddelbare feedback (tabel 2).

1. semester:	3. semester:
- "God fordeling over semesteret"	- "Ord og grammatik i testene passede godt til timerne"
- "Varierede emner, meget interessant"	- "Meget forskellige opgaver"
- "Jeg kan godt lide den direkte feedback"	- "+ sproglig feedback"
	- "Mere intensivt end andre kurser"
	- "Der er god workload"

Tabel 2. Eksempler på evaluerende kommentarer 1.

Omvendt fremhæves som negativt 1) arbejdsbelastningen, 2) en for høj sværhedsgrad i nogle øvelser og 3) en feedback, som i nogle tilfælde ikke opfattes som informativ nok. På tredje semester er der kritik af de opgaver, der ligger som forberedelse til et nyt emne, altså fx indøvelse af et nyt ordstof uden forudgående introduktion, og en enkelt peger på, at det mundtlige kommer til kort ift. det skriftlige. Holdene er fælles om at fremhæve de skriftlige afleveringer som 'bedre' end it-sl-opgaverne (tabel 3, næste side).

1. semester:	3. semester:
<ul style="list-style-type: none"> - "Hellere skriveopgaver frem for itsl-test." - "Jeg kunne godt lide de kreative skriftlige opgaver (O2, O8), fordi man kunne fortælle lidt om sig selv og sine interesser." 	<ul style="list-style-type: none"> - "Frie skriveopgaver (assignments) er bedre end udfyldningsopgaver." - "For mit vedkommende hjælper det ikke ret meget at aflevere opgaver som 'fill in the blank', lytteforståelse, gloser. For mig ville det være bedre at få en (kort) opgave, hvor jeg selv kan tænke lidt."

Tabel 3. Eksempler på evaluerende kommentarer 2.

Den sammenhængende skrivning i de skriftlige afleveringer opfattes altså af disse studerende som mere udfordrende for tanken og som en mulighed for anderledes kreativ og personlig udfoldelse.

4. En konklusion: Værktøjets potentialer og begrænsninger

Det, jeg konkluderer på baggrund af bl.a. de studerendes evalueringer, er, at værktøjet fungerer som en god variationsmulighed. Og at det har en motiverende effekt. Det var ikke et krav ift. undervisningsdeltagelse at besvare andet end 8 af de 10 opgavesæt, men 64% på 1. semester og 52% på 3. semester besvarede alle opgaver 100%. Samtidig er det dog tydeligt, at itsl-testene med undtagelse af *open answer*-typen ikke kan sidestilles med endsige erstatte egentlige skriftlige afleveringer.

I lidt forenklet form kan nogle centrale opsamlende pointer samles i en oversigt som den følgende, hvor Lysters (2017) faser tjener som skelet, og testværktøjets øvelsesformater sættes op over for den "skriftlige aflevering" (figur 4).

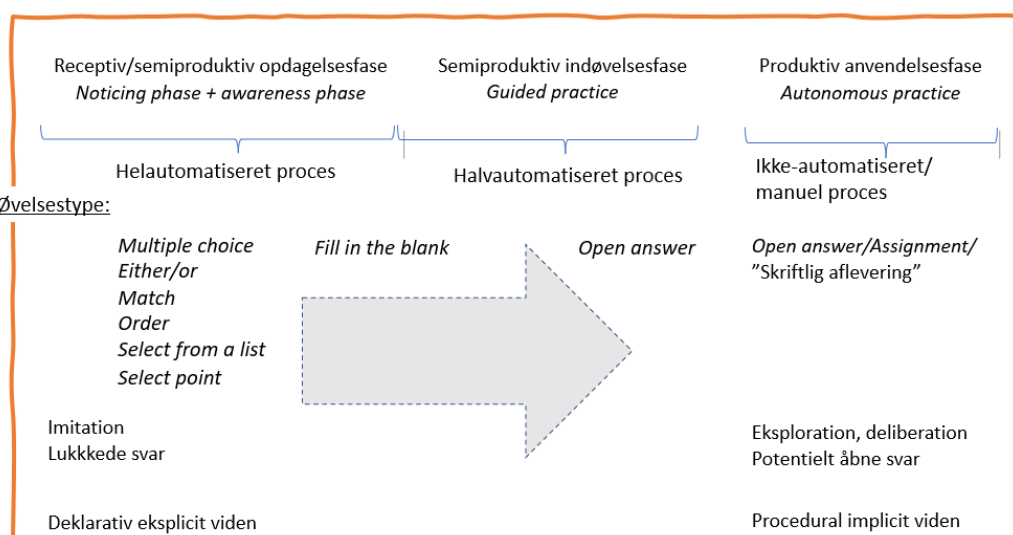


Fig. 4. Testformaterne tænkt ind i faseekvenceret læring

De fuldt automatiserede testformater giver først og fremmest mulighed for træning af de receptive, evt. semiproductive sprogkompetencer. *Open answer*, sådan som øvelsestypen er blevet anvendt i den beskrevne sammenhæng, er en øvelsestype, som giver mulighed for, at de studerende fx aktiverer deres interpretationsevne og kan "dybdebearbejde" (jf. Andersen e.a. 2018: 58) forskellige sproglige

formuleringer i kortere svar. *Open answer* kan også anvendes som egentligt *assignment* format til længere skriftlige besvarelser og dermed give samme muligheder for selvstændig sprogproduktion som den "skriftlige aflevering", der kræver manuel rettelse. Denne selvstændige sprogproduktion er her sat som dels en kontrast, dels et udviklingsmål, som Itsl-opgaverne føder ind i eller er grundlag for, når de fungerer optimalt. Ift. den studerendes tænkning og videntilegnelse kan Itsl-opgaverne give paratviden og til dels praktisk-produktiv kyndighed i at bruge sproget. De bygger på imitation af en norm, hvor den selvstændige sprogproduktion i den længere besvarelse i højere grad giver plads til, hvad jeg her har kaldt "deliberation" og "eksploration", altså mulighed for selvstændig diskussion og udforskning af tanker og ideer mhp. professionel og akademisk dannelse. Testværktøjet muliggør især træning af en deklarativ, eksplicit viden, men kan, rigtigt og integreret anvendt, føde ind i og træne en skriftlighed, hvor denne viden helst skulle have udviklet sig til en procedural og implicit viden.

Litteratur

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Production Pedagogy: Exploring the potential of aesthetic production in project work — getting started on thesis writing

Connie Svabo, Professor, Dep. of Mathematics and Computer Science, University of Southern Denmark

When supervising master's thesis research projects, I draw on action orientation, aesthetics, and production-oriented pedagogy to help students build an understanding of the subject matter they are working on and shape it in the form of a thesis. Informed by the performative potential of media and modes of communication, I work with students' aesthetic production. Examples include facilitated exercises of drawing, writing, and imagining future scenarios.

At a three-hour writing workshop within the first month of thesis work, students are guided through a series of exercises. These include a visual exercise, where students draw their thesis landscape; a non-stop writing exercise where each student s individually write a fictional guided tour of the thesis landscape; and a dialogical, non-stop writing fictional radio interview, where I set the scene and ask questions, pretending to be a radio host. The students respond in writing, imagining a future scenario in which they are discussing their completed thesis work on national radio.



Exercise: Thesis Landscape — in drawing

Lecturer / facilitator guides students in a drawing exercise. Students work with color markers on large pieces of paper (tabloid / A3 or larger). The work is carried out in silence.

Suggested introduction by facilitator to students:

Imagine your thesis as a landscape. This can both be the subject matter or the process. What kind of landscape or space is it? Is it a rugged terrain? Are there particular parts of it that are smooth or have a nice vista? What does it overlook?

Duration: about 20-30 minutes.



Exercise: Guided tour — in writing

Students work in writing, providing a written description of the thesis landscape they have just drawn. Suggested introduction by facilitator to students:

Give a guided tour of your imagined thesis landscape. Depending on the kind of landscape, you can undertake the role of tourist guide, museum guide, landscape architect, or whatever you find appropriate. Imagine you are taking somebody on a tour. Describe to them what they are seeing. Use details and assume the authority of the guide.

Duration: about 15 minutes.



Exercise: Radio Interview — in writing

The lecturer / facilitator conducts a fictitious interview with the thesis writer. The facilitator speaks. The student responds in writing only. The exercise can be carried out in a group of students, each of whom writes their own response.

Suggested introduction by facilitator to students:

Imagine a future situation. You have just finished your thesis and handed it in. Now you have been asked to participate in a radio program focusing on new knowledge produced at Danish universities. As host, I will interview you. You respond in writing.

In an upbeat voice, the facilitator says:

”Hello and welcome to the studio, and welcome to you (student name). Thank you so much for taking the time (...) Can you help me – what is the title of your thesis... and how did you go about it (...)”

The ‘interviewer’ asks guiding questions about the thesis focus, method, case, results, importance etc. allowing time for the student to respond in free flow ‘non-stop’ writing.

Recommendation: prepare 5-8 questions. Allow approximately 2 minutes between each question in order for students to write response.

Approximate duration: 10-20 minutes.

The workshop and exercises particularly target the beginning of the thesis process — working with the research question and motivation. The purpose of the set of activities is to help students envision, materialize and shape their project – as well as their *understanding* of the project.

The exercises have been developed on the basis of project supervision in the social sciences, humanities and natural sciences. The intervention is not discipline-specific, but rather a technique / approach which can be used across disciplines in thesis supervision at graduate level, when students are doing their final thesis.

The workshop and exercises have been developed through five years of experience of conducting and being in charge of thesis writing workshops for a great many students of Communications Performance Design at Roskilde University, as well as the supervision of 20 thesis projects in Social Sciences / Humanities, 8 thesis projects in Mathematics / Sciences, 6 undergraduate projects in Social Sciences / Humanities and 3 undergraduate projects in Mathematics / Computer Science. I have also successfully used the exercises for a methodology course at PhD level with more than twenty participants.

What did you intend the students to achieve from this teaching and learning activity/curriculum intervention?

The teaching and learning activity draws on aesthetics and design thinking – for example, in the form of techniques of rapid prototyping and principles of “failing fast” to stimulate the creative and productive aspects of coming to know something. This allows students to bypass (too) critical-analytical approaches, which (in some instances) can block their writing process. (There is a need for critical-analytical skills in project writing, but not all the time.) Leaping into aesthetic production in a “rapid” and associative manner has a generative effect — the students produce artefacts (texts, diagrams, drawings) that enact a future project into being. The project attains a life of its own, through its external(ized) materiality.

This addresses an (in my opinion) overlooked aspect of project pedagogy: It is a *production* pedagogy; a pedagogy where students *make* things. Project work is an intellectual endeavor of knowledge production; of making knowledge and doing knowing. This knowledge production is intricately interwoven with aesthetics and mediation. Acts of knowing are communicational and rhetorical acts whose content, audience, presentation, staging and medium must be taken into consideration in the production of knowledge statements.

In an educational context, project work is an alternative to mono-disciplinary, curriculum-based education. One of the important *raison d'être* for project-based learning is that it breaks with traditional hierarchies and predefined categorizations of knowledge. Instead, a student-participant —or “real-world” — approach is taken. Students are trained in finding and formulating problems and communicating about them. Nevertheless, the process of finding out what to write about and how to do it can be daunting! Particularly if the student has limited prior experience with project work and working with material of their own choice.

In my experience, the described exercises can contribute to student’s initial project development. These playful exercises may help students enter creative-productive modes of engagement which can support them in dealing with the openness at the beginning of a project process. The activities themselves exercise associative openness and try to bypass overly convergent processes at an early stage of the exploration of

the project. This implies letting go of the idea that one must have very clearly defined aims or goals in order to get started on a project. In this respect, I draw on Eisner (who draws on Dewey):

“In Western models of rational decision making the formulation of aims, goals, objectives or standards is a critical act; virtually all else that follows depends upon the belief that one must have clearly defined ends. Once ends are conceptualized, means are formulated, then implemented and the outcomes are evaluated. If there is a discrepancy between aspiration and accomplishment, new means are formulated. The cycle continues until ends and outcomes are isomorphic. Ends are held constant and are always believed to precede means.”, Eisner (2003, 378) writes and continues, “But is this true? In the arts it certainly is not. In the arts ends may follow means. One may act and the act may itself suggest ends, ends that did not precede the act, but follow it.”

Drawing on Dewey’s concept of *flexible purposing* (1938), Eisner describes processes where ends shift and where the work yields clues, that one pursues. They emerge, unpredictably and in self-organizing ways: “In a sense, one surrenders to what the work in process suggests.” Aims shift while the work is being carried out. This implies working openly with and in given situations, to allow for the dynamics, energies, and interrelations between the various forces which are at play in knowledge practices as well as creative practices.

“Flexible purposing is opportunistic; it capitalizes on the emergent features appearing within a field of relationships. It is not rigidly attached to predefined aims when the possibility of better ones emerges. The kind of thinking that flexible purposing requires thrives best in an environment in which the rigid adherence to a plan is not a necessity. As experienced teachers well know, the surest road to hell in a classroom is to stick to the lesson plan no matter what.” (Eisner 2003, 378)

Eisner builds on Dewey in highlighting the value of artistry in education. Eisner argues that artistry can serve as an important cognitive countermodel to mechanized and hyper-rationalized visions of education which give priority to pre-specification of intended outcomes through standards and are governed by desires for educational productivity and measurement.

I draw on the openness and emergent character of Eliot’s “artistry” in the thesis workshop exercises. When I invite students to plunge in and pretend, they are being interviewed for a radio program about a thesis whose development is far from certain at this stage, this is an example of surrendering to emergent accounts of what it *might* look like.

The creative-productive approach that art and aesthetics offer is complimentary to critical-analytical modes of engagement.

According to you and the students, what was the impact of the teaching and learning activity on student learning / engagement / development of skills?

The assessment of impact of the interventions is based on dialog with students and lecturer observation and reflections. As mentioned, I have done these exercises over many years and with many groups of students, and with variations in sequence and framing. I have consistently found that the students greatly appreciate the tangibility of the exercises. The students value the actual production of text or other

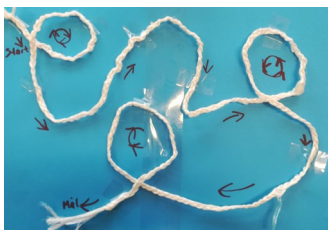
artefacts. It gives them something to take away. Some students also say they feel liberated by being able to access a more creative space in relation to their project work.

The success criterium for the work is that the students find the workshop assists them in making their thesis work more tangible and feasible.

How could your practice be inspirational / transferable to other teachers, students, and institutions in future teaching / designs of study?

Other lecturers can also take inspiration from the specific exercises and the framework of production pedagogy and use these in relation to their own supervision and teaching or in facilitated project-writing workshops.

Examples of student drawings



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An application of audience response system in a hybrid teaching environment based on Bloom's digital taxonomy

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1. Introduction and literature review

Nowadays, with the rapid development of ICT (information communication technologies), teaching is becoming more and more convenient and versatile that can be conducted anywhere with internet access, for instance, the online lectures and the hybrid teaching [1]. The hybrid teaching can be defined as the teaching style utilizing multimedia and different digital tools for immediate feedback from learners, enable students' learning in both a virtual and physical environment. However, challenges of using new technology in hybrid teaching are also large in order to increase the teaching and learning effect, which will eventually affect the pedagogical quality.

In a traditional classroom practice, the Bloom's taxonomy [2] is normally utilized for educational objectives. This theory has been demonstrated to effectively facilitate the learning outcomes in traditional classrooms thus has been widely adopted [3]. With the occurrence of new technologies such as web technology, digital tools, remote teaching and hybrid teaching, the students' learning behaviours by using the Bloom's taxonomy should be further studied to enhance the active learning outcomes and develop the creativity for the 21st century.

In the past decades, there has been a considerable amount of teaching practice and research for the application of Bloom's taxonomy strategy and the use of audience response system in lectures. Benjamin Bloom [2] first developed his taxonomy of educational objectives, which looked at the cognitive domain. He described each category of the educational objectives from lower order of thinking skills to higher order of thinking skills, which, in teaching practice, included knowledge, comprehension, application, analysis, synthesis and evaluation. Then, Anderson [4] proposed the revised version of taxonomy in education based on Bloom's original work, where the six levels were replaced by the new ordered categories including remembering, understanding, applying, analysing, evaluating, and creating. The creativity was set to be higher than the evaluation in cognitive domain. Churches [5] in his work updated the taxonomy concept in digital domain, accounting for the new processes and actions associated with the occurrence of new technologies such as remote teaching, hybrid teaching and web technology. Among all the technologies, the audience response system was widely accepted and utilized [6-10], which is to get immediate feedback from learners, helping teachers to focus more on the difficulty level of learners. Among others, Poll Everywhere [6,10] is a web-based audience response system in education circles, as a student polling system. Use of the system allows for increased interactivity by promoting a two-way flow of communication between the speaker and the audience. Kappers and Cutler [7] investigated the impact of implementing Poll Everywhere on student engagement in an introductory computer science large lecture classroom (n = 291). Castillo et al [1] studied the using of Poll Everywhere system in medical education and

found that it has increased satisfaction with didactics after the incorporation of the tool. Sikarwar [9] investigated the impact of implementing flipped classroom with the Poll Everywhere tool on student engagement in large group teaching for active learning.

However, no such teaching practice has been found in a hybrid teaching environment so far where there are some students physically attending in the classroom together with the teacher, some students physically attending on the virtual part of the hybrid teaching classroom without the teacher and the rest of students simply attending online. This scenario inevitably brings tremendous challenges to the pedagogical process and learning quality for both teachers and students, especially in the active learning aspect. Therefore, the aim of this paper is to investigate the effect of the implementation of audience response system in such a hybrid teaching environment based on Bloom’s digital taxonomy, which hopefully brings an active learning atmosphere and yields a better learning outcome.

2. Learning objectives

The learning objective is to investigate the effect of the implementation of audience response system in a hybrid teaching classroom based on Bloom’s digital taxonomy. To what extent, it will benefit the active learning atmosphere of students and their learning outcomes in terms of understanding of theory, improving of programming skills and the gaining of problem-solving competence in data science.

3. Course introduction and hybrid teaching classroom

The course, entitled “data science and machine learning”, introduces master students with few programming skills to the field of data science and equips them with practical skills of data handling and analysis. Typical machine learning algorithms are taught, however, focuses are on the immediately application and practical problem solving. Figure 1 shows the initial programming levels of students before the starting of the course via a simple-vote of the audience response system-Poll Everywhere, where 37 out of 49 students provided responses. As seen in this figure, 27% of the students knew nothing about any programming languages, while 21.6% of the students knew quite a lot. Half of the students (51.4%) had a little bit experience. Such distribution of programming levels requires a careful design of the interactive teaching activities via Poll Everywhere.

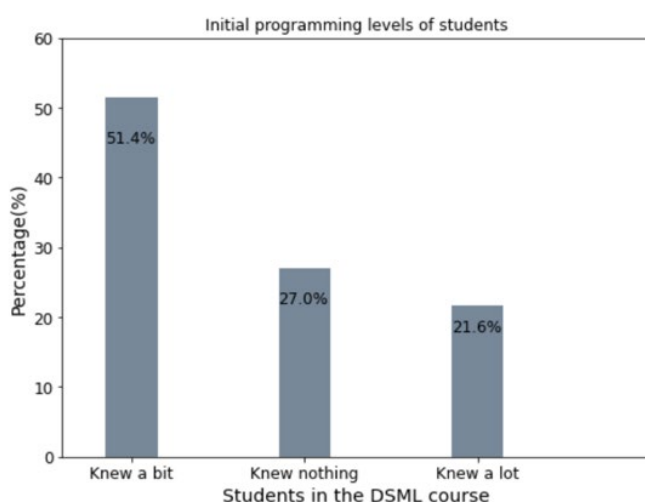


Figure 1: The students’ programming levels before the start of the course.

The hybrid teaching environment is used for this course, containing two classrooms located at two different campuses of the university of southern Denmark, one in Odense and the other in Sønderborg. Multiple cameras and screens are deployed inside the classrooms and a central audio system is used to amplify sound. A control system is used to control all the multimedia. Using this hybrid teaching environment, students from two campuses are required to attend physically, however, they are still allowed to join online if necessary. Theoretically, the implementation of this hybrid teaching will make a smooth and efficient teaching. However, big challenges are introduced by such a so-called “high-technology” style for both teachers and students in practice, for instance, the easily broken/not-working cameras and audio system, the pop-up technical issues, and the constant sign-in/out of online students waiting for teachers to approval, etc.

4. Case study

4.1 In-class digital activities

Different in-class digital activities via Poll Everywhere [6] are designed based on the Bloom’s digital taxonomy theory [2,4,5] to activate students and produce better learning. A simplified procedure [3], namely simple-vote, think-pair-share and peer instruction, is adopted. All these activities are directly integrated into lecture slides and students can access these activities via either a QR code or a web browser link. The corresponding activities are small quizzes, mini-tasks and challenge tasks, which are explained as follows:

- *Small quizzes (simple-vote)*

The designed small quizzes consist of simple questions via the multiple-choice in Poll Everywhere. The aim is to facilitate students to briefly recap the theory and concepts described in class. Students need to response with their cell phones or laptops via links. Voting results will be presented on screen timely to have an explicitly comparison. Opinions of students will be asked to see the selection reasons. In this activity, there is few or no needs of coding. In general, these questions are very simple on the basic level of knowledge.

- *Mini-tasks (think-pair-share)*

This next level of activity is called mini-task. In order to find correct answers, simple coding is needed. The relevant dataset and tasks are explicitly described in a Jupyter notebook. Students can first talk with their peers and then solve questions together with coding. Their answers should be shared via Poll Everywhere as well. Besides, Open-ended questions are designed if needed to receive students’ opinion after their discussions. This activity is trying to help students applying the knowledge they have learned.

- *Challenge tasks (peer instruction)*

The last level of the designed activity in class is called challenge tasks. The aim is to further improve the problem-solving skills and the coding competence of students by analysing and evaluating of practical

problems. More complex tasks are described and shared with students at the end of the class. For these questions, students need to work together with their classmates after class.

Therefore, through the implementation of these in-class digital activities via Poll Everywhere, the students are forced to be actively involved to some extent with an attractive way.

4.2 Data collection method

The designed in-class digital activities are applied for half semester, a digital survey is conducted by the audience response system, collecting the students' feedback on them. Questionnaires are designed from three different categories. One is from the facilitation of learning outcome in terms of understanding of knowledge, the second one is on the learning efficiency in terms of interactive learning atmosphere and the third one is on the general impression such as extra workload and recommendation. Therefore, there are 10 questions proposed for this digital survey, including 9 simple-votes questions and one open question. For each question, five options are provided: 1 for strongly disagree, 2 for partly disagree, 3 for neither/nor, 4 for partly agree and 5 for strongly agree. There are 30 responses out of 49 students, which is used for result analysis.

4.3 Result evaluations

According to the collected data from the digital survey, comparison diagrams are made, as seen in Figures 2 to 4. It is found that, from Questions (Q) 1 and 2 in Figure 2, there is a very strong positive effect on the basic understanding of knowledge. No strongly disagree has been found. A few students (4% in Q3) strongly disagree about the improving of coding competence by challenge tasks, which is probably due to the fact that these activities are non-compulsory. For the second category about active learning atmosphere, as seen in Figure 3, more than half of the students (63% and 55%) have a positive attitude, but there is a small fraction of students who disagree. It indicates that there are still spaces to improve, especially for those students online and on the other side of the classroom.



Figure 2: Students feedback from the first category

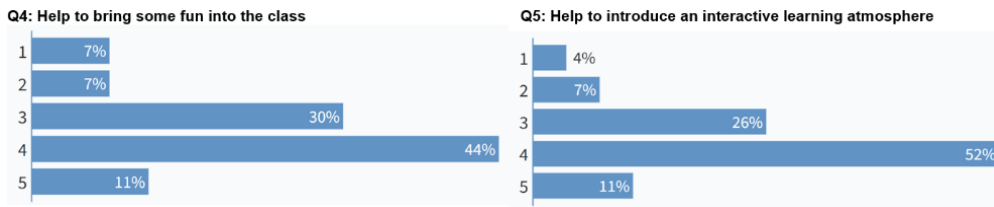


Figure 3: Students feedback from the second category

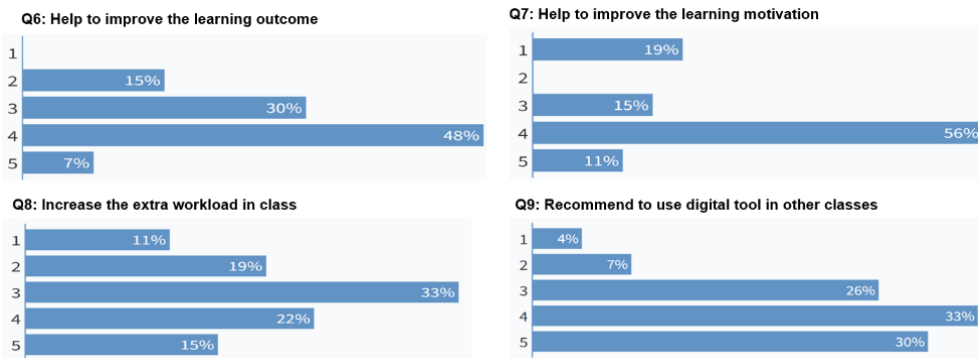


Figure 4: Student feedback from the third category

Overall, it is observed that the audience response system is a good tool to improve the learning outcome of students, as seen in Q6 from Figure 4. No strongly disagrees have been found. Most of the students (Q9) will recommend the using of digital tool in other classes. Besides, there is always a portion of students who have neutral attitude, which is normal from the standpoint of practice. It is interesting to see that there are 19% of students who have a strong negative attitude to the effect of learning motivation by using such a way, which implies that the correlation between these two variables is weak and other pedagogical strategies are needed to motivate students. Finally, there is a bell-shape distribution of the data when it comes to the increase of extra workload in classes (see Q8 in Figure 4), which reflects a possible downside of using digital tools.

5. Reflective description of experiences

In this paper, an application of audience response system in a hybrid teaching environment based on Bloom's digital taxonomy has been conducted. The designed in-class teaching activities were applied for the students from a master's course. The hybrid teaching environment was used, and a digital survey was used to collect students' feedback. The results show that such a digital application has enhanced the effect of active learning and facilitated the improving of programming competence for students with non-computer science background.

Other reflections are briefly described here. The bringing of the hybrid teaching environment has also introduced large challenges to both teachers and students, which needs to be taken into account in future pedagogy. For instance, the hybrid teaching classroom is not always working properly due to technique problems and the teachers are stressful to handle everything simultaneously. The planned in-class class activities and then the teaching quality may be largely affected as a consequence. A suggestion is to

provide a thorough guideline of the new hybrid teaching environment and an efficient feedback/help system from the side of technicians at universities. Although the majority of students embraced the implementation of new technology and new teaching styles, there was still a few students who did not easily get used to them. Thus, more attention should be paid to these students when implementing of audience response system in lectures in order to create better active learning atmosphere.

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Teaching creativity online – A curriculum and learning environment for upskilling Higher Education educators

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Creativity is predicted to be an important skill for the future job markets (Kim et al., 2017; Frey & Osborne, 2017). With digitalization becoming key in all sectors (Gandhi et al., 2016), Higher Education's future is steered towards distance learning. Even though HE educators' awareness, knowledge, readiness, and capacity for using digital learning materials increased dramatically since the COVID-19 pandemic (Giridharan, 2020), we find that current online curricula at European universities fall short of pedagogical approaches for teaching and rewarding creativity adequately (Mbatl and Minnaar, 2015; Bashir et al., 2021). A reason for this is that creativity requires direct connection with others, which necessitates instructional environments that allow for face-to-face phronetic experience (e.g., Nonaka and Toyoma, 2007; Kaiser and Fornidal, 2010).

Teaching creativity online requires research into systematic approaches that enable HE educators to incorporate creativity methods and techniques into online teaching environments. The TICON Erasmus+ project therefore conducted an interview study with 32 and follow up focus groups with 60 HE educators from Turkey, Ireland, Denmark, and Germany to identify their challenges and upskilling needs. The latter were used to develop the online learning platform, which is open and free to be used by HE educators to gain inspiration for their online teaching.

Learning Goals and Curriculum

The main objective of TICON curriculum is to present the learning approach and contents for HE teachers to overcome challenges and provide quality online education in creativity. Through the extensive learning platform, the HE teachers will gain the following:

- Knowledge:
 - know about using creative methods in online classrooms
 - understand the basic concepts of creativity for Engineering
 - understand what creative thinking is
 - know different methods and techniques that can be used in online classrooms

- Skills:
 - be capable to evaluate what methods and tools should be used in what type of class to enable teaching creativity online
 - select appropriate tools
 - find ways to motivate their students to participate in creative online teaching

- Competences:
 - design learning environments, sessions and classes that include creative methods and tools
 - apply appropriate creative methods and tools in online classrooms
 - overcome the social challenges in Engineering classes for teaching creativity online

The TICON learning platform consists of three units of learning material and a method- and toolbox. The material there will be referred to and used in the learning material of the units. The method- and toolbox consists of the following three elements: 1) Introduction: How to use the toolbox. 2) List of technology tools linked to implementing creativity methods in online settings. 3) List of creativity methods for the different engineering areas covered in teaching (Problem identification and then definition, Idea generation, Prototype and Test).

The learning material can be downloaded from the website. It guides the teachers through all important steps in designing and conducting a creative online session while simultaneously requiring them to answer reflective questions that help them to improve their online teaching approaches.

Research Design & Results

An explorative and qualitative research approach is required to understand the needs of HE engineering educators (Flick, 2014). The frame of the European project, TICON (Teaching Creativity ONLINE), provided us with the opportunity to conduct a qualitative multi-level needs analysis.

Even though the challenge is a global one, cultural (Semmler et al., 2018) and engineering field-specific perspectives (Sarsar et al., 2021) influence the conceptualization and practice of creativity teaching and learning environments. Therefore, these perspectives were considered in the sampling for our needs analysis. We used a purposive, high variation sampling strategy (Flick, 2014) to recruit HE engineering educators from a wide range of European countries, including Turkey, Ireland, Denmark, and Germany.

In the first step, we conducted comprehensive experience interviews – an experience-centred form of episodic narrative interviews (Mueller, 2019) – with 32 HE engineering educators (eight from each country) from various engineering disciplines. Interviewees were asked to elaborate on positive and negative experiences when using creativity methods and techniques in both classroom and online teaching settings. As a result, challenges and upskilling needs were identified. These findings served as the basis for the development of a draft curriculum by the consortium members. Both were then presented to a total of 60 HE engineering educators in all four countries in focus groups lasting 1.5 hours (Fern, 2001).

The challenges which HE educators experience in teaching creativity online revolve around eight central topics: 1) Making sense of the importance of teaching creativity in an online education, 2) dealing with social dynamics and 3) building relationships, 4) organizing professional exchange, 5) planning and

conducting effective creativity-related lessons, 6) managing technology, 7) selecting suitable creativity methods and techniques, and 8) evaluating student performance.

Moreover, the participants of our interview study and focus group highlighted that be(com)ing skilled in teaching creativity online will impact student learning, engagement, and competence development in the following ways: It...

- supports both students and educators developing the creativity skills necessary for online environments in future jobs, and thus to avoid a dangerous knowledge GAP.
- enables deeper learning, higher participation, and more vivid interaction in online teaching environments.
- allows for implementing alternative student performance measures that orient students (and HE educators) about what creative performance is.

TICON Learning Environment

TICON will provide HE engineering teachers with the theoretical knowledge and practical skills to use creativity methods and techniques to teach their course subject and related creativity topics, in online and hybrid contexts, aligning with the pedagogical objective of their course. They will learn how to ensure that student motivation, skills attainment and skills assessment is enhanced in the most adequate and efficient way. It also will give HE engineering teachers a deeper insight and understanding of creativity, and teaching creativity in online engineering contexts, which will enable the efficient adoption of relevant methods and techniques.



Creativity Toolbox

The HE teachers will have free access to the e-learning platform where, with our training and learning materials, the teachers will be able to upskill and know how to use creativity methods in engineering education and teach creativity online.



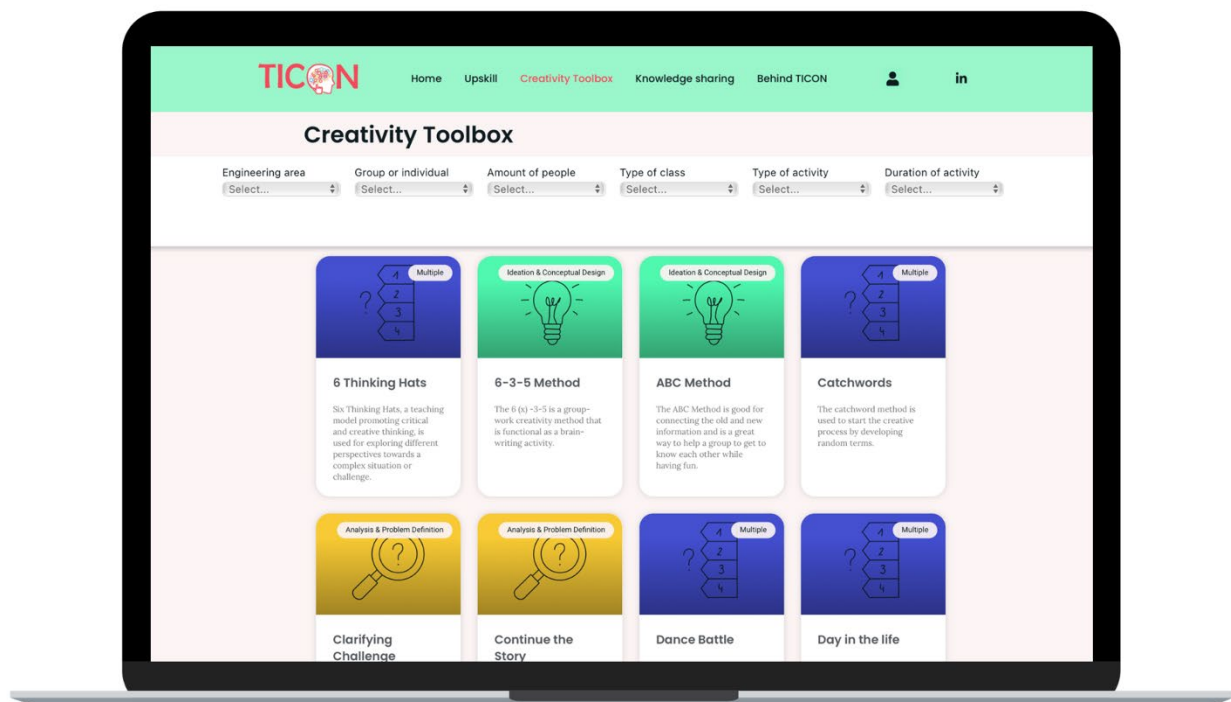
Upskill

Together with the learning materials, the HE teachers will have access to over 50 creativity methods in the TICON Creativity Toolbox. Here it is described when to use which method, how to use them, and what is needed to implement them.



Knowledge Sharing

The TICON environment also contains a knowledge sharing platform, where HE teachers can share their experiences and knowledge of creativity methods in online teaching with other HE teachers.



TICON's Mission

"TICON provides Higher Education Engineering institutions and their teachers with the knowledge and skills to address the challenges of using creativity methods and tools for teaching in online (or hybrid) settings, ensuring the quality of teaching and the quality of the student's learning processes."

www.creativityteaching.eu

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Making reflective learning journals work

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1. The pedagogical challenge

Being university educators, we strive to educate students beyond any specific course. We want to support the students through the small part of their life journey which is their university education. As part of our teaching in the Innovation and Entrepreneurship educational track in the bachelor's programme in Sports and Health, the 10 ECTS course titled IN5 – Partnerinnovation and Metalearning is a course where the development of innovation competence is at the forefront. The course design draws on the instructional approach of Project-Based Learning (PrBL), which according to Roessingh and Chambers (2011), has the potential to motivate and engage learners in tasks that support deep learning and allow a high degree of learner autonomy.

The most prevalent educational task we face is to support students to mature as active and reflective learners. This is a natural part of a student's development through university, where a continuous process develops, inspires, and forms the student as an academic. To succeed in this process, the students are required to find interest and see personal relevance in a process of academic integration which is also affected by the goals and commitments of the students (Johannsen et al., 2020). In our teaching, a part of this integration is the development of the ability to engage in reflective learning, which we see as foundational for 21st-century learning. Drawing on the 21st-century learning framework developed by Kereluik et al. (2013), this academic integration includes the development of Foundational Knowledge (to Know), Humanistic Knowledge (to Value), and especially Meta Knowledge (to Act). This aligns well with the PrBL design principle that instruction should be mediated and integrated to promote critical reflection and higher-order thinking skills (Roessingh and Chambers, 2011).

Innovation and design are constructive disciplines with which the students often have little or no experience. Therefore, the development of the ability to engage in reflection and awareness of own learning processes are important aspects which are integrated into the course learning objectives. To support and mediate reflective learning and to develop reflective abilities, we draw on the comprehensive work on reflective learning and the use of learning journals by Moon (2006). According to Moon, learning journals can be perceived as vehicles for reflection to support mental processing to fulfil a purpose or to achieve an anticipated outcome specified in terms of learning, action, or clarification. Furthermore, reflective abilities encompass reviewing, analysing, and evaluating situations to learn from the experience and apply such insights to future situations (What Is Reflective Ability | IGI Global).

In this article, we will present our work with designing and implementing the Reflective Learning Journal and associated activities to increase the reflective abilities of the students. Based on a description of the learning activity, we will present the impacts and findings from the evaluation, finishing off with concluding remarks and perspectives.

2. The Reflective Learning Journal and supporting resources

A Reflective Learning Journal (RLJ) format with supporting learning activities and resources was developed (Figure 1). The main source of inspiration for the design and implementation of the RLJ was the comprehensive work on learning journals by Moon (2006), combined with our teaching experience. Moon (2006) offers a set of interconnected considerations when setting up journal writing as a learning activity which has guided the design of the initiative and activities.

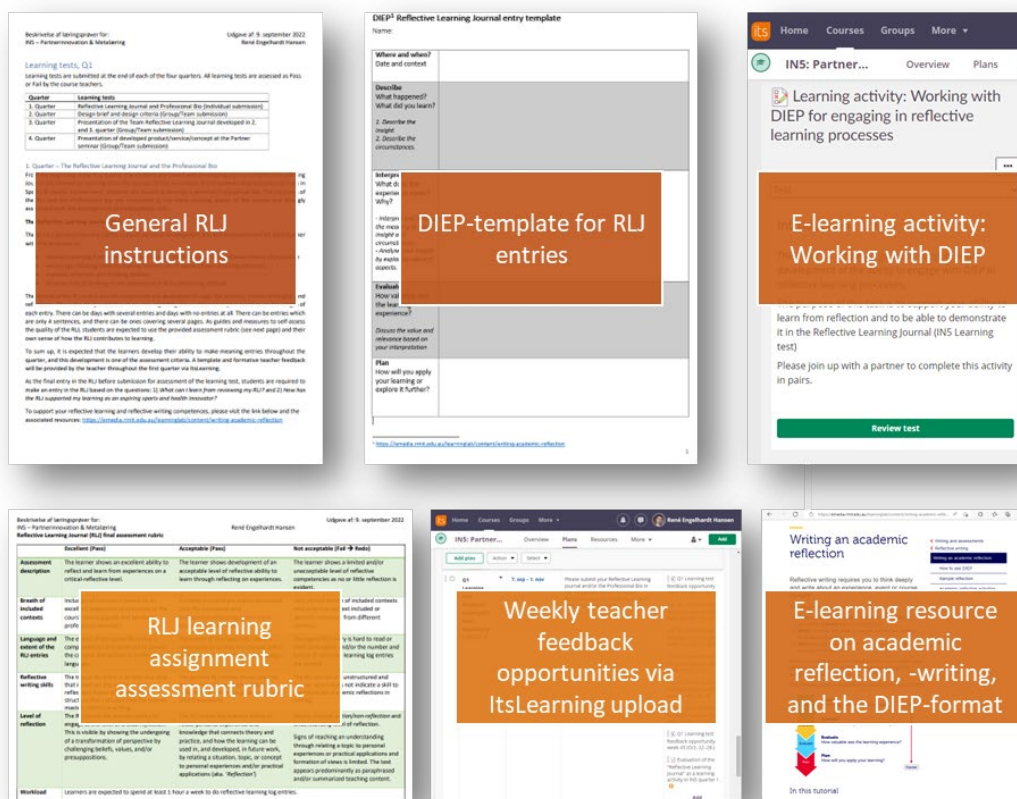


Figure 1 - Designed and implemented RLJ learning activities and resources.

As previously stated, the main purpose of the RLJ learning activity was to increase students' reflective abilities. For the form of journal writing a written format structured with the DIEP-process for academic reflection (Describe, Interpret, Evaluate, Plan) was chosen due to its relatively simple structure and availability of supporting e-learning resources (RMIT University Library Learning Lab). A DIEP-template with guiding questions was developed to reduce the engagement threshold for the students.

To strive for optimal **fit within course design and level of integration**, the RLJ was directly connected to the learning objectives of the course as a learning assignment (pass/fail). The RLJ was further linked to other course learning activities and concurrent courses, which could supply the themes and insights needed to build reflection. The planned initiative was carried out with ten students in the first quarter (1 ECTS).

An overview of **anticipated tasks involved** with implementing the RLJ was developed and operationalised with a blended learning approach combining in-class face-to-face and online learning activities (Hrastinski, 2019). The face-to-face activities were integrated with the four existing lessons during the quarter and consisted mainly of introduction, discussion, and general feedback. Online learning activities included online reading material and exercises to support knowledge and skill development and formative feedback on RLJ entries based on student uploads on ItsLearning.

A formative feedback approach was applied for monitoring and assessment with weekly submission opportunities for written formative feedback. To support clarification and feedback quality, an assessment rubric was developed. The design of the assessment rubric was informed by Moon (2006) and Kember et al. (2008) to contain categories concerning 1) Breadth of included contexts, 2) Language and extent, 3) Reflective writing skills, and 4) Level of reflection. Reflective abilities can be hard to develop, and formative feedback was applied to support a progressive learning experience towards the learning goal (Newton, 2007). Furthermore, the notions of feed-up, feedback, and feedforward (Hattie & Timberley, 2007) were integrated.

Students were instructed to spend 1 hour per week to perform DIEP-entries and to seek formative feedback 2-3 times during the quarter. No requirements regarding the number of RLJ entries or the length of entries were initially set to reduce the threshold for engagement with the RLJ. No mandatory topics or insights on which to perform reflections, except that the final RLJ-entry should concern the topic of what they had learned from working with the RLJ. The reasoning behind this was that the student's reflections regarding their learning outcome from engaging with the RLJ could itself be an important contributor to reaching the purpose of the RLJ and thus a part of the evaluation of the learning experience and outcome.

The students were involved in the considerations around trust-building, privacy, and ethical issues. Due to general insecurity among the students associated with displaying reflections, an initial thought to implement peer assessment and a blog format was abandoned. Instead, trust was sought by setting up the RLJ submissions as assignments on ItsLearning with teacher-only access. Any examples included in class were done with permission. Teaching staff openness in the learning situation was explicitly stated. Combined with the decision regarding confidentiality, students were invited to be critical towards the teacher and the course and ensured that this would only be perceived as valuable feedback to the course teachers.

To support the actual introduction of reflective activities, Moon (2006) proposes a two-stage approach which informed the design of learning activities and the implementation (Figure 1). The first of the two stages focus on presenting reflection to get the students started with engaging in reflection. The second stage focuses on facilitating deeper reflection. The outcomes from the considerations above were captured in the General Instructions of the RLJ learning assignment.

3. Data collection method and evaluation

A survey was applied to evaluate the learning experience of the RLJ and associated resources. The survey was distributed via ItsLearning on Nov. 3, 2022, coinciding with the date for submitting the RLJ as a learning assignment. The choice of the survey method has been made to enable the students to answer anonymously and to enable comparison of selected aspects in the evaluation. Respondents' answers to multiple choice questions and matrix questions were analysed through descriptive statistics. Open questions were put in to enable qualitative responses to selected questions to enable personal experiences and opinions to surface. The qualitative data were subjected to inductive thematic analysis to reveal key findings.

Descriptive statistics on ItsLearning user data and teacher experiences from the implementation of the RLJ will be included in the interpretation and reflection upon the survey data.

4. Impact and evaluation

According to the final RLJ evaluation survey, students generally perceived a positive learning outcome from working with the RLJ (figure 2 – see next page). Concerning the most important learning outcomes, 90% of the students agree or strongly agree that they have increased their ability to engage in reflection and that working with the RLJ has improved their awareness of their own learning processes. 60% agree or strongly agree that working with the RLJ has improved their reflective writing skill. These are positive indicators of student development of reflective abilities which corresponds well with the teacher's perceptions.

The outcomes associated with applying the reflective skills were less positively evaluated. This includes the ability to learn from experience, the ability to raise questions, and the development of a questioning attitude. These results indicate that although students perceive to have gained reflective ability, knowledge and skills, the outcome in terms of competence (understood as the application of knowledge and skills in contexts) was achieved to a lesser degree. However, the result is interpreted as an obvious opportunity as the development of competence will likely improve over time if the reflective abilities are put into use in different contexts.

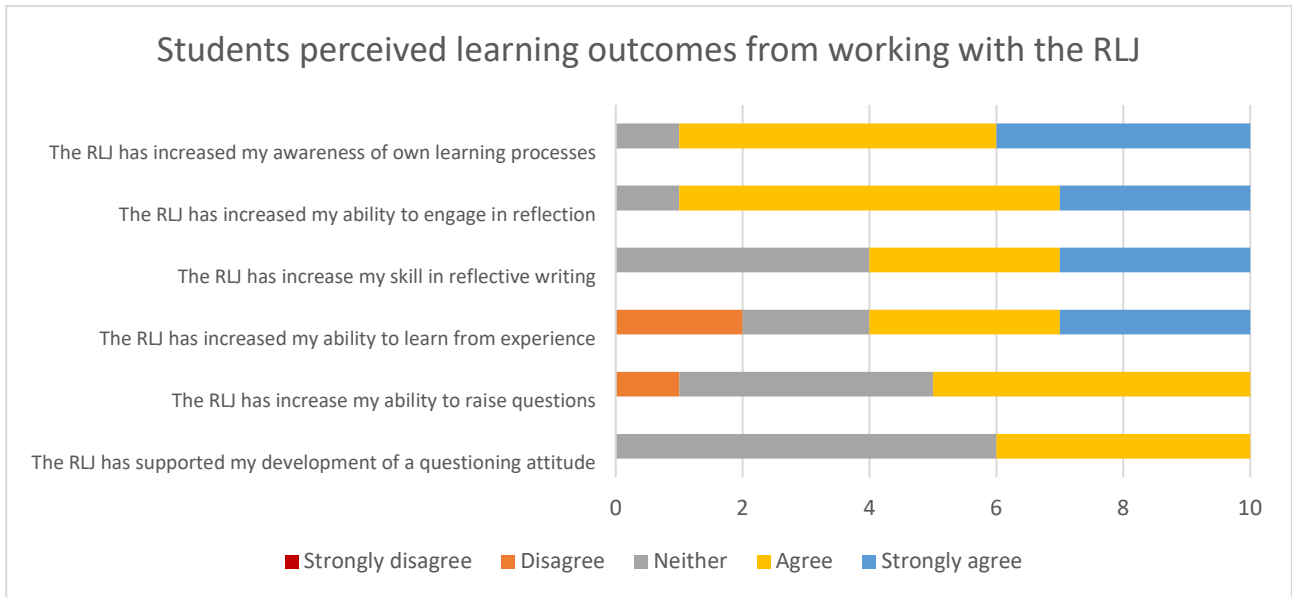


Figure 2 - Students perceived learning outcomes from working with the Reflective Learning Journal

The student evaluation and the teacher's experience indicate that working with the RLJ to develop reflective abilities have been demanding. Although the evaluation indicates that the developed activities and resources associated with the RLJ did support the students (Figure 1), the evaluation indicates two main challenges: 1) Getting past the engagement threshold and 2) Further development of reflective abilities.

Getting past the engagement threshold is, of course, of vital importance, as engagement with the RLJ over time is essential to achieve the learning potential. Even though formative feedback was introduced as a vital part of supporting students learning, only 40% of the students requested feedback within the first half of the course. Furthermore, 50% of the students responded that they did most of their RLJ-entries near the end of the quarter and the learning assignment deadline. According to student feedback, this challenge arises from 1) a lack of mental surplus due to a high workload across courses, 2) difficulty to identify relevant insights to reflect upon, and 3) a lack of understanding about what was expected in the learning assignment. While these interrelated factors can be further discussed, the design of the learning activity might be improved to reduce the engagement threshold. Potential relievers expressed by the students include: 1) Examples of academic reflection, 2) Topics or insights to base reflections, 3) Increased in-class teacher support and facilitation - especially during the introductory phase.

The second challenge is **further developing reflective abilities** after getting past the initial engagement threshold. Students expressed that it was a challenge to understand and use the DIEP-structure, identify relevant insights, and structuring reflection. That students have struggled with these aspects is perceived to be learning enhancing as they are indicators of the actual development of reflective abilities which was the purpose of introducing the RLJ. However, the evaluation points towards some value contributors in the effort to engage with the RLJ, including 1) Formative teacher feedback, 2) Supporting questions/prompts, 3) A structure for engaging in reflection (e.g., DIEP), 4) Discussions with teachers and peers in-class.

An interesting insight was the different perceptions of value contribution from the formative teacher feedback and the assessment rubric. Both sources should clarify expectations in the learning activity for the students, which has been identified as a challenge in the evaluation. However, while 80% of the students responded that the teacher feedback provided via ItsLearning on submitted RLJ entries was useful or very useful, 90% rated the perceived usefulness of the Assessment Rubric as low. Providing formative feedback on the RLJ-entries was prioritised and a rather teacher resource-demanding task, so it is positive that the students found it valuable. Considering the relatively early stage of the student's educational journey, the ability to self-assess might not yet have been developed and, therefore, could be a natural next step. Nevertheless, improving the Assessment Rubric to become useful for the students and/or increasing their ability to use the Assessment Rubric to self-assess would be beneficial to reduce teacher workload. Introducing self-assessment, peer-feedback, or peer-assessment as part of the implementation is an interesting area for further exploration.

5. Concluding remarks and perspectives

The goal of introducing the RLJ was to support the development of academic reflection abilities. The evaluation results show that the RLJ did increase students' reflective abilities and provided insights regarding the personal learning process. Thus, the RLJ has supported the development of reflective abilities as the basis for engaging in reflective learning.

According to Moon (2006), the introduction of learning journals as a learning activity requires a lot of forethought, and even with forethought, it is unlikely that a journal will be "right" initially. This resonates well with our experience. Learning journals are a powerful tool for learning but can be a demanding learning activity to design by the teacher and to engage in for the students. As the learning potential will only be unleashed if requirements and expectations are balanced with time and resources, it is key that a learning journal is designed to comply with the purpose and goals of the context in which it is implemented.

Based on our experience with designing and implementing the RLJ, we offer the following take-away points:

- Identify a clear purpose of the learning activity and ensure integration with course learning goals.
- Put extra effort into introducing academic reflection and supporting students to get past the engagement threshold.
- Allocate time in-class to discuss reflection and facilitate peer discussions.
- Use a clear framework for academic reflection (e.g., "DIEP")
- Reduce the effort required by students to get started to engage in reflection by providing mandatory topics for reflection.
- Consider ways to balance teacher workload by introducing self-assessment and/or peer feedback to empower the students and encourage self-regulation.
- Encourage metacognition by making "Reflection on the content of the RLJ" the final RLJ topic.

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Teaching quantitative methods to social scientists: Motivation & Challenges

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The pedagogical challenge

Students of non-quantitative study programs find statistics intimidating and perhaps useless. This is especially true at the Bachelor level. However, the feeling may persist at the Master level. Earlier research on the specific topic refers to “statistics anxiety” as a concept, which as many as 80% of university students experience (Onwuegbuzie, 2004). Further research indicates the negative consequences of this phenomenon, linking it with failures to graduate or delayed graduations (Onwuegbuzie, 1997). Additionally, two studies find an increase in students statistics anxiety levels between a pre-course test and a post-course test (Ramirez & Bond, 2014; Swanson, VanderStoep & Tintle, 2014). All the above studies were conducted at different American universities, with generalizability of findings being implied. However, more recent literature points towards high school mathematics as a central focal point in explaining statistics anxiety (Huang, 2018), raising concerns about the validity of US findings outside of their specific national and cultural context. The diversity of teaching style and formal requirements towards high school mathematics courses in different education systems must be considered.

We conduct a survey among first semester political science students in Denmark, finding that traces of statistics anxiety can indeed be identified, similar to what has been found in previous US studies. A variety of additional activation tools are applied during the semester and a follow-up survey is conducted to see whether it was possible to reduce anxiety levels during the semester. We aim at answering the following research questions:

- What is the optimal way of introducing a theoretical quantitative concept?
- Can the introduction of activation help students’ confidence and engagement?
- Which tools would be best to use?

Learning objective connected to the activity

“Teaching quantitative methods to social scientists: Motivation and Challenges” addresses a threefold learning objective:

- To make students of non-quantitative study programs more confident with quantitative methods, specifically statistics;
- To make the quantitative methods classes more engaging and useful;
- To improve awareness of subject relevance, i.e., importance of quantitative methods in non-quantitative study programs.

Setting

In the present study, we share our experience of teaching and interventions during the Metode 2 course (10 ECTS) for the Bachelor in Political Science, Faculty of Business and Social Sciences at University of Southern (SDU)¹. The course spanned from February 2022 through June 2022, comprehensive of theory lectures and practical exercises classes. Here we focus on the theory classes, which usually follow a traditional way of teaching, i.e., two hours of weekly frontal instruction. In total, 123 students were enrolled in the course, about 70 were regularly following the classes (physically – no opportunity for online or distance learning). The course is second in a row of three methodological courses and intended to be the primary course on applied quantitative empirical methods during the students' bachelor education.

Course Learning Goals

- Knowledge:
 - Basic features of the quantitative analysis techniques.
 - Basic features of different types of data and variables, as well as typical distributions.
 - Prerequisites and limitations of the quantitative analysis techniques examined.
- Skills:
 - Use the reviewed quantitative analysis techniques to analyse relevant social science issues.
 - Analyse quantitative data material using the Stata statistical software program.
- Competences:
 - Critically discuss quantitative analysis results.
 - Assess the usefulness of the quantitative analysis techniques to examine a given social science problem.
 - Use a language that is subject-oriented, accurate, and correct.

The activity

The proposed initiatives work on three levels and are designed to strengthen knowledge, develop skills, and improve competences.

¹ For more details on the specific course, see the official course description: <https://odin.sdu.dk/sitecore/index.php?a=searchfagbesk&bbcourseid=B360021101-1-F22&lang=en> – accessed 14/02/2023

By strengthening knowledge, students' confidence and motivation will increase. By developing skills and improving competences, students' engagement and awareness will improve. To do so the proposed interventions make use of the following strategies:

- **Collaborative learning interventions** achieved through
 - Interactive slides with live student poll activities (Poll Everywhere) for remembering tasks and efficient, instant, feedback (single answer).
 - Poll Everywhere activities for critical thinking (think-pair-share).
 - Classroom shared drawing for theory visualization as a student response system based on drawings.

- **Interactive lecturing interventions** using
 - Realistic data and visual graphs to introduce theory.
 - Start from the basics and build on it, using the same set of realistic data throughout the course.
 - Show coherence with study plan and relevance for future, both academically (bachelor thesis) and labour market (job descriptions).

Survey data were collected at two different points in time: at the beginning of the course in February (first lecture before break) and at the end of the course in June (last lecture before exam). 10 questions for each survey were proposed to the students via Poll Everywhere Survey system, addressing the concepts of motivation, challenges, and awareness.

Intermediate data were collected via Poll Everywhere in each class through above mentioned collaborative learning interventions, i.e., single answers or think-pair-share polls for immediate feedback that could indicate potential misunderstandings and a need to reiterate.

Evaluation of the carried-out activity

The process of carrying out the planned development project activities has been straightforward, after a training in Poll Everywhere system and Classroom shared drawing. Planned activities were well perceived in the class. The theory classes, which follow a relatively traditional frontal instruction approach were divided in students' activation times for the planned activities, i.e., one or max 2 activities per 45 minutes.

The results from the teachers' and the students' evaluations show the following²:

- Single answer tasks for valuable immediate feedback for the lecturer can be seen boring and not so useful from the students' perspective.
- Think-pair-share activities are valuable and positively taken from both lecturer and students helping the teacher to capture promptly some weaknesses in the understanding/knowledge that the students get, and helping students being more confident and engaged.

² The full before & after survey results have been uploaded to GitHub:
<https://github.com/fege14/TAL-Metode-2-Survey>

- Classroom shared drawings worked similarly to think-pair-share activities with more focus on the visualization of theoretical concept, e.g., how to draw a regression line and what does it mean to make an OLS estimation. This really helps to connect to mathematical formulas.

In terms of what content and how the content is presented, students' clearly benefit from the following:

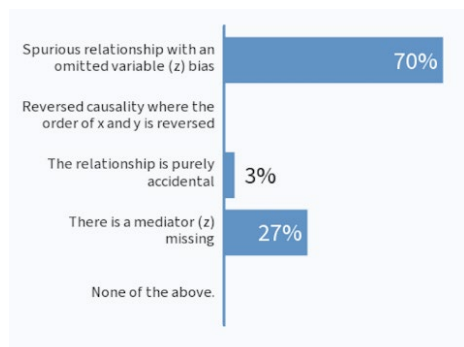
- Start from the basic concepts using a graphical example that analyses realistic data coherent with the subject of the study plan.
- Repeat the same set of data from class to class, meaning less focus on understanding the data itself and more focus on the data analysis and the building of the analysis in higher and more complex data.
- “Declutter” because the covered material is often too extensive. Students might find it hard to understand which are the most important parts and which details might be less relevant. Therefore, we suggest to “declutter” material and give strong highlight to the crucial concepts. Concepts that are of vital importance can be revised and strengthened during activation time for example.

These general principles can be adopted in the vast majority of taught subjects and can benefit students across disciplines.

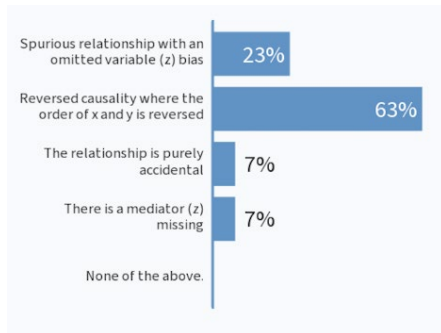
Example of class that introduces the concept of causality in statistics

- Introduction of how the new concept is linked to what has been covered so far, e.g., *association/correlation* has to be differentiated from causation.
- Use a practical example in political science with realistic data already used in previous classes.
- Show the students a video taken from a TEDx talk about the danger of missing up causality and correlation.
- Theoretical explanation of the concept by the lecturer.
- Activation time in form of think-pair-share activity linked to the TEDx talk with the following four questions to answer via Poll Everywhere questions, followed by discussion to correct what part students got wrong:

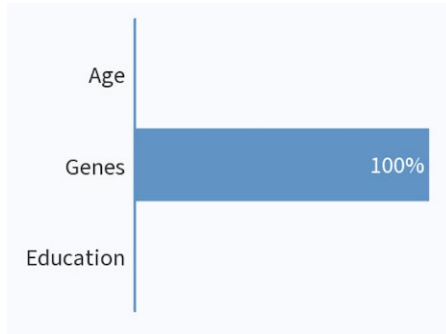
1. The correlation between drownings (y) and ice cream (x) is an example of



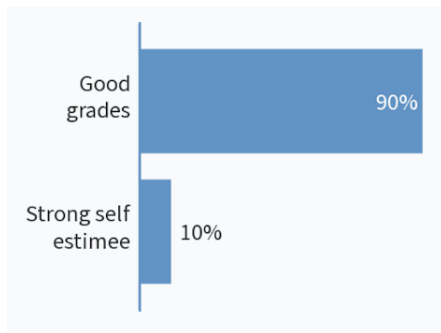
2. Correlation between marital status and life expectancy is a case of



3. In the correlation between young kids sleeping with the light on and risk of developing short-sightedness the omitted variable is



4. In the correlation between kids with good grades and kids with strong self-esteem. What comes first?



Conclusion

This paper investigates the phenomenon of "statistics anxiety" among first semester political science students in Denmark and explores the potential of various pedagogical interventions to alleviate this anxiety. We conducted a survey at the beginning and end of the semester to assess the impact of the interventions, which included collaborative learning through interactive slides, live student polls, think-pair-share activities, and classroom shared drawing, as well as interactive lecturing using realistic data and visual graphs. Although the absence of a control group limits our ability to conclusively determine the effectiveness of these interventions in reducing statistics anxiety, the positive feedback received from students suggests that they found think-pair-share activities and shared classroom drawing particularly

helpful. The findings of this study can inspire educators in other subjects and faculties to adopt similar pedagogical approaches, ultimately helping to improve students' confidence, engagement, and understanding of quantitative approaches in fields otherwise not primarily quantitative.

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