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Upskilling Digital Pedagogy

Opettajien ja opettajaksi opiskelevien digipedagogisen osaamisen kehittäminen

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E-Teach tuntisuunnitelmat

Opettajien ja tulevien opettajien digipedagogisen osaamisen kehittäminen

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E-Teach Digitaalisen pedagogiikan tuntisuunnitelmat

Sisällysluettelo

e-teach
Upskilling Digital Pedagogy

Moduuli 1
Digitaalisen pedagogiikan käsitteet

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MODUULI 1: DIGITAALISEN PEDAGOGIIKAN KÄSITTEET

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SISÄLTÖ

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1.1. Moduuli 1 Oppitunti 1

Aihe: Digitaalisen pedagogiikan käsitteet

Kesto: 2 tuntia (120 minuuttia)

Oppimistavoitteet: Tunnin lopussa osallistujat pystyvät:

(1) Ymmärtämään digitaalisen pedagogiikan käsitteen,

(2) Kertomaan eron digitaalisen pedagogiikan ja perinteisen pedagogiikan välillä,

(3) Selittämään, miksi digitaalinen pedagogiikka on olennaista monimuoto- ja etäopetuksessa,

(4) Antamaan esimerkkejä digitaalisen pedagogiikan käytöstä luokassa.

Opetusmenetelmät/-tekniikat:

(1) Yksilötyö,

(2) Keskustelu,

(3) Kysymyksiä ja vastauksia (K&V),

(4) Yhteisöllinen oppiminen.

Oppimis-opetusaktiviteetit:

(1) Ennen oppituntia: Tulevat opettajat (osallistujat) lukevat tarvittavan taustatiedon ja tutkivat verkkoresursseja digitaalisesta pedagogiikasta ennen oppituntia. He lukevat myös ”Knowlege Paper of Digital Pedagogy".

(2) Oppitunnin aikana:

a. Oppitunnin alussa tulevat opettajat jaetaan neljän hengen ryhmiin.

b. Pienissä ryhmissään he keskustelevat digitaalisen pedagogiikan olennaisista piirteistä ja osatekijöistä ottaen myös huomioon digitaalisen pedagogiikan ja klassisen pedagogiikan yhtäläisyydet ja erot. Tämä kestää noin 10 minuuttia.

c. He keskustelevat myös siitä, miten digitaalinen pedagogiikka liittyy monimuoto- ja etäopetukseen pienryhmäkeskusteluissa. He hyödyntävät muistiinpanoja yhteisessä ryhmäkeskustelussa. Tämä kestää noin 10 minuuttia.

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d. Opettaja seuraa ryhmäkeskusteluja, vastaa heidän kysymyksiinsä ja antaa palautetta. Tämä kestää noin 10 minuuttia.
e. Koko ryhmän keskustelun aikana ryhmät jakavat muistiinpanonsa muun luokan kanssa. Tämä kestää noin 5 minuuttia.
f. Jakamisen jälkeen opettaja tiivistää digitaalisen pedagogiikan perusnäkökohdat ja sen, miten sitä voidaan toteuttaa luokassa. Tämä kestää noin 15 minuuttia.
g. Tämän jälkeen opiskelijat palaavat pienryhmiinsä. Ryhmissään he suunnittelevat opetustuokion/tunnin, jolla esitellään opiskelijoille digitaalisen pedagogiikan käyttöä tunneilla. Tämä kestää noin 20 minuuttia.
h. Jokainen ryhmä tuottaa ensimmäisen luonnoksen opetustoiminnasta. Tämä kestää noin 5 minuuttia.
i. Opettaja seuraa heidän edistymistään ja antaa palautetta tarvittaessa.
j. Myöhemmin kaikki toiminnot jaetaan koko ryhmän kesken ja keskustellaan. Tämä kestää noin 30 minuuttia.
k. Opetustuokiot/tunnit julkaistaan verkossa.
l. Lopuksi he kirjoittavat reflektiopaperin digitaalisesta pedagogiikasta ja sen merkityksestä verkko-opetuksessa. Tämä kestää noin 15 minuuttia.

Arviointityökalut:

(1) Vertaisarviointi on tarpeen ryhmien oppimisen arvioinniksi.
(2) Itsearviointi on tarpeen oman edistymisen yksilöllisen arvioinnin määrittämiseksi.
(3) Esseen kirjoittaminen on välttämätöntä ryhmäprosessien ymmärtämiseksi.
(4) Rubriikkeja käytetään suunniteltujen toimintojen arvioimiseen.

Teoreettinen tausta (englanniksi)

Transfer and organization of knowledge in educational organizations, developments in technology, differentiation of communication forms, and change and complexity of the knowledge and skills that students need to gain; bring many innovations in the field of education. The 21st Century Skills Partnership Organization published standards for the 21st Century Student report to integrate technology and education; it is to equip all components of the education system with skills appropriate to the conditions of the age

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and to ensure the active use of these skills in education (Partnership for 21st Century Skills, 2003).

According to Mishra and Koehler (2006), the inclusion of technology in the teaching process has become necessary within the scope of the age requirements, both for teachers and pre-service teachers. In this context, rather than using technological tools in the course, teachers should present these tools by integrating them with their pedagogical knowledge.

Today, the benefits of digital technologies have been seen in learning and teaching processes in educational institutions. The concept of digital pedagogy also describes the use of technologies in learning and teaching processes. Kivunja (2013) defines digital pedagogy as the inclusion of computer-assisted digital technologies in the art of teaching that enriches learning, teaching, assessment and the entire curriculum.

Digital pedagogy uses electronic devices to enhance or change the educational experience (Croxal, 2012). Advances in technology with each passing day necessitate the development of the methods used in education. Therefore, the transition to online education systems brought many learning innovations. Many students and teachers met new opportunities thanks to the advantages of online education methods.

As it is known, technology alone cannot provide good learning. Meanwhile, digital pedagogy is not only the effective use of technological tools; it can be defined as the creation of practical learning experiences for the student, quality and purposes of education with the help of digital devices. Digital pedagogy is a critical perspective on the useless and aimless use of technological tools. While using traditional blackboard in the classroom is pedagogical knowledge, digital pedagogy focuses on suitable tools for which student group or how digital technology can increase participation and mutual interaction and perpetuate learning.

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1.2. Moduuli 1 Oppitunti 2

Aihe: Tiedon sosiaalinen rakentuminen luokkahuoneissa

Kesto: 1 tunti (60 minuuttia)

Oppimistavoitteet: Tunnin lopussa osallistujat pystyvät:

(1) Selittämään, mikä tekee luokkahuoneesta rakentavan,

(2) Keskustelemaan siitä, miten tieto rakentuu sosiaalisesti luokkahuoneympäristössä,

(3) Luettelemaan tiedon sosiaalisen rakentamisen olennaiset piirteet luokkahuoneissa.

Opetusmenetelmät/-tekniikat:

(1) Ryhmäkeskustelut,

(2) Parityöskentely,

(3) Kysymyksiä ja vastauksia osallistujien kesken,

(4) Kysymyksiä ja vastauksia opettajan ja osallistujien välillä.

Oppimis-opetusaktiviteetit:

(1) Ennen oppituntia: Osallistujat lukevat ensin taustatietoa tiedon sosiaalisesta rakentumisesta tavallisessa kouluympäristössä (ks. alla oleva Teoreettinen tieto -osio). Lisäksi heitä kannustetaan käyttämään verkkotietokantoja tunnistamaan

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tutkimusjulkaisuja digipedagogiikkaan siirtyvien luokkien perusominaisuuksista. Osallistujat saavat ohjeet luennoitsijalta siitä, kuinka löytää ensisijaiset ja toissijaiset lähteet verkossa.

(2) Oppitunnin aikana:

a. Opettaja alkaa määrittämällä keskeiset käsitteet aiheesta taululle: sosiaalinen rakentaminen, tiedon rakentaminen, perinteinen luokka ja sosiaalinen rakentaminen. Tämä vie noin 10 minuuttia tai niin.

b. Jakauduttuaan kolmeen ryhmään osallistujia pyydetään keskustelemaan ja kirjoittamaan määritelmiä kyseisistä käsitteistä. Se vie noin 15 minuuttia.

c. Osallistujat keskustelevat jatkaakseen määritelmiä, sisältäen kysymyksiä ja vastauksia sekä joitakin ohjeita opettajalta (jos tarpeen väärinkäsitysten ja selkeyttämisen osalta). Tämä vie noin 20 minuuttia.

d. Luennoitsija tiivistää määritelmäkeskustelun ja kuvaa luokkahuoneiden peruspiirteitä tunnin jälkeen, kiinnittäen erityistä huomiota siihen, miten tieto muodostuu sosiaalisesti. Lisäksi siihen sisältyy jonkin verran opetusta sosiaalisen rakentamisen teoriasta. Tämä vie noin 15 minuuttia.

(3) Oppitunnin jälkeen: Osallistujien on kirjoitettava yhden oppitunnin essee, jossa he kuvaavat, kuinka he näkevät tyypillisen luokkahuoneen ja sen oppilaat hankkimassa tietoa sosiaalisessa ympäristössä.

Arviointityökalut:

(1) Kysymykset ja vastaukset: Tämän oppitunnin ensisijainen arviointityökalu on kysymykset ja vastaukset opiskelijoiden kesken ja opettajan ja osallistujien välillä.

(2) Essee: Essee-tehtävä antaa palautetta opettajalle osallistujien tavoitteiden saavuttamisen arvioimiseksi.

Teoreettinen tausta (englanniksi)

Bandura (1986) defined pedagogy; as teachers' pedagogical beliefs that affect their teaching behaviours in the classroom. In addition, Shulman (1986); claimed that pedagogy and content knowledge should not be separated but handled together; how do I teach it?" teachers who seek an answer to the question should have content

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knowledge, pedagogical content knowledge, and curriculum knowledge. A traditional pedagogical comprises predefined learning goals, the teacher's role as an expert and the students' role as completing the given closed-ended tasks (Väätäjä & Ruokamo, 2021).

These concepts emphasize that teachers should reduce the knowledge to a level that students can comprehend with the competencies that will combine the skills they need with today's technologies and integrate education with life in a traditional classroom. In this context International Educational Technologies Association (ISTE, 2008), teachers with technology qualifications should be relevant, being technology literate, using technology and directing students to use technology.

Considering the changing conditions and the qualifications of today's students, the digital generation, teachers and teacher candidates, digital tools are expected to be equipped to comprehend the languages and integrate them with pedagogical content knowledge (Anderson, 2008).

It is known that teachers mostly use PowerPoint as a digital tool in traditional classrooms (Klecker, Hunt, Hunt, & Lacker, 2003) and that many students in schools have problems with technology adaptation and use (Stephens, 2005). In addition, technology integration in education alone is not enough for success. External-environmental factors such as teacher attitudes, methods and techniques used, course materials, physical conditions, and the school are influential in students' academic success; emotional-cognitive factors such as students' positive attitude towards the course, their perception of being able to succeed and their motivation affect academic success (Howie & Pieterson, 2001).

Technology integration in education has become a necessity (Liao, 2007). However, teachers' technology-related competencies and their ability to implement and design technology-supported activities are in a linear relationship with the perception of self-efficacy. Increasing the efficiency and quality of the education process by adapting technology to the education system is directly related to training visionary teachers equipped with the competencies of the age. These qualifications are directly proportional to the education of teacher candidates. These qualifications require applying methods and techniques to develop digital pedagogical competencies at the highest level, including information technologies in education faculties (Mishra & Koehler, 2006).

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1.3. Moduuli 1 Oppitunti 3

Aihe: Johtaminen ja digitaalinen pedagogiikka

Kesto: 1 tunti (60 minuuttia)

Oppimistavoitteet: Tunnin lopussa osallistujat pystyvät:

(1) Selittämään, mistä johtaminen oppimisympäristössä koostuu,

(2) Keskustelemaan siitä, mitä digitaalinen johtajuus tarkoittaa,

(3) Antamaan joitakin keskeisiä esimerkkejä eroista perinteisen oppimisympäristön ja digitaalisen johtamisen välillä,

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(4) Luettelemaan digitaalisen johtamisen olennaiset piirteet.

Opetusmenetelmät/-tekniikat:

(1) Ryhmäkeskustelut,

(2) Parityöskentely,

(3) Kysymyksiä ja vastauksia osallistujien kesken,

(4) Kysymyksiä ja vastauksia opettajan ja osallistujien kesken

Oppimis-opetusaktiviteetit:

(1) Ennen oppituntia: Osallistujat lukevat ensin taustatietoa johtamisesta (ks. alla oleva Teoreettinen tieto). Lisäksi heitä kannustetaan etsimään verkon tutkimusjulkaisuista tietoa digitaalisen johtamisen peruspiirteistä.

(2) Oppitunnin aikana:

a. Aluksi opettaja määrittelee käytetyt termit aiheen kuvaamiseksi: johtaminen, johtaminen tyypillisessä luokkahuoneympäristössä ja digitaalinen johtajuus. Tämä vie noin 10 minuuttia.

b. Osallistujat jaetaan kolmen hengen ryhmiin ja heitä pyydetään keskustelemaan ja kirjoittamaan määritelmiä tulevaa keskustelua varten. Tämä vie noin 15 minuuttia.

c. Osallistujat osallistuvat sitten luokkakeskusteluun määritelmien jatkoksi. Tämä sisältää joitain keskusteluja, kysymyksiä ja vastauksia opiskelijoiden kesken, samoin kuin joitain ohjeita opettajalta (tarvittaessa väärinkäsitysten ja selkeyttämisen vuoksi). Tämä vie noin 20 minuuttia.

(3) Oppitunnin päätteeksi keskustelun määritelmästä ja perinteisen luokkahuoneen peruspiirteiden tunnistamisesta keskitytään erityisesti siihen, miten opettaja voi ylläpitää digitaalista johtamista. Lisäksi mukana on hieman nykyaikaista johtajuusfilosofiaa. Tämä vie noin 15 minuuttia.

(4) Oppitunnin jälkeen osallistujien on kirjoitettava essee, jossa he kuvaavat, kuinka he ymmärtävät digitaalisen johtajuuden ja kuinka opiskelijat virtuaaliluokkaympäristössä reagoivat siihen.

Arviointityökalut:

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(1) Kysymykset ja vastaukset: Tämän oppitunnin ensisijainen arviointityökalu on kysymykset ja vastaukset opiskelijoiden kesken sekä opettajan ja osallistujien kesken.
(2) Essee: Essee-tehtävä antaa palautetta opettajalle osallistujien tavoitteiden saavuttamisen arvioimiseks.

Teoreettinen tausta (englanniksi)

A leader is responsible for implementing all the changes in the organization. This perspective of change proves it to be the leader's vision only which can bring organizational success and growth as a result of the adoption of any transformation. It can be defined that the concept of digital pedagogy and leadership is fundamentally about change. Because the change in digital pedagogy requires transformation and leadership, leadership is more about evolution than stability. Leadership is critical because it strongly determines direction and outcomes at the micro level of schools or broader systems. Learning education provides leadership's main form and purpose of creating and sustaining environments conducive to good learning. Innovation is an integral part of learning leadership in setting new directions. Remote teaching must provide learning experiences of the same quality for pupils as contact teaching. Policymakers and school administrations are also paying attention to these changes when designing and planning in-service training for teachers (Väätäjä & Ruokamo, 2021).

Digital leadership practices align closely with transformational and transactional leadership styles with an emotional intelligence orientation (Aldawood et al., 2019). Additionally, Sheninger (2014) defined digital leadership as not about flashy tools but a strategic mindset that leverages available resources to improve what we do while anticipating the changes needed to cultivate a school culture focused on engagement and achievement.

It is a transformed construct of leadership that grows out of the leader's symbiotic relationship with technology. Different dimensions of what elements can be used to indicate successful digital leadership exists. For example, Zhong (2017) mentioned digital leadership in education as accepting, adopting, and applying new technologies to transform schools into digital-age places of learning. Digital pedagogy not only inspires

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educational change but also aims to engage students, teachers, and all other stakeholders in the transformation.

On the other hand, from the perspective of digital pedagogical leadership, it requires creating or developing the vision and technology-based school culture necessary for the school's future success. In addition, pedagogical leadership requires a combination of mindset, behaviour, and skills to employ the essential training to develop employees' skills in line with this vision and culture. In line with these combinations, it can be said that leaders with pedagogical leadership competencies are needed to achieve schools' goals.

Digital Pedagogy leaders should primarily prefer digital information and technology management and create conditions for production with added value. In addition, in terms of human resources management, instead of using the control element frequently, it should be able to gather employees around the vision. According to Oz (2019), the task of school leaders is to reveal the talent and potential of the human resources in the school in line with the organization's goals. In this context, digital pedagogical leaders should cooperate with stakeholders to train human resources in line with digitalization and school vision and reveal their potential. As it can be understood from here, digital pedagogy, which is based on the human element, provides opportunities for education stakeholders to express themselves, create spaces for dialogue and discussion, and engage in reflective thinking skills rather than just transferring information.

Lähteet

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1.4. Moduuli 1 Oppitunti 4

Aihe: Digitaalinen pedagogiikka korkeakoulutuksessa

Kesto: 2 tuntia (120 minuuttia)

Oppimistavoitteet: Tunnin lopussa osallistujat pystyvät:

(1) Selittämään, mitä digitaalinen muutos korkeakoulutuksessa sisältää,

(2) Antamaan esimerkin kustakin digitaalisen muutoksen menetelmästä korkeakoulutuksessa,

(3) Antamaan joitakin kriittisiä esimerkkejä siitä, mitä muuttuva digitalisaatio on tuonut korkeakoululaitoksille.

Opetusmenetelmät/-tekniikat:

(1) Ryhmäkeskustelut,

(2) Parityöskentely,

(3) Kysymyksiä ja vastauksia osallistujien kesken,

(4) Kysymyksiä ja vastauksia opettajan ja osallistujien kesken.

Oppimis-opetusaktiviteetit:

(1) Ennen oppituntia: Opiskelijat lukevat ensin taustatietoa digitaalisesta pedagogiikasta korkeakoulutuksessa (ks. alla oleva Teoreettinen tieto). Heidän on myös kirjattava ylös yksilölliset kokemuksensa digitalisaatiosta erilaisissa koulutuskonteksteissa.

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(2) Oppitunnin aikana:

a. Opettaja alkaa määrittelemällä keskeiset termit aiheesta taululle, mukaan lukien "digitaalinen muutos", "menetelmät digitaaliseen muutokseen korkeakoulutuksessa" ja "digitalisaatio". Tämä vie noin 10 minuuttia.

b. Opettaja pyytää osallistujia jakamaan näkemyksiään siitä, miten heidän oppilaitoksensa ovat omaksuneet digitalisaation. Opettaja keskittyy digitalisaatiotekniikoihin kokemuksissa ja kirjaa ne taululle lisäkeskustelua varten. Tämä vie noin 15 minuuttia tai niin.

c. Opettaja seuraavaksi selittää, miten osallistujien kokemukset jaetaan erilaisten digitalisaatiotyyppien alle. Kullekin digitalisaatiotekniikalle luennoitsija tarjoaa lisää esimerkkejä tarvittaessa. Tämä vie noin 20 minuuttia.

(3) Opettaja käy läpi määritelmäkeskustelun ja luettelon digitalisaation peruspiirteistä tunnin lopulla, kiinnittäen erityistä huomiota siihen, miten digitalisaatio muodostuu ja ylläpidetään korkeakoulutuksessa. Lisäksi mukana on tietoa digitalisaation teoriasta. Tämä vie noin 15 minuuttia tai niin.

(4) Oppitunnin jälkeen osallistujiat kirjoittavat esseen, joissa heidän tulee selittää, miten he ymmärtävät digitalisaation korkeakoulutuksessa ja tarjota esimerkkejä digitalisaatiosta omassa kontekstissaan.

Arviointityökalut:

(1) Kysymykset ja vastaukset: Tämän oppitunnin ensisijainen arviointityökalu ovat kysymykset ja vastaukset opiskelijoiden kesken sekä opettajan ja osallistujien kesken.

(2) Essee: Essee-tehtävä antaa palautetta opettajalle osallistujien tavoitteiden saavuttamisen arvioimiseksi.

Teoreettinen tausta (englanniksi)

Digital transformation is a concept that defines the process of finding solutions to social and sectoral needs with the integration of digital technologies and, accordingly, the development and change of workflows and culture. One of the potential environments where digital transformation will take place is the field of higher education. Digitization is

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linked to digital transformation for universities and colleges' target groups to determine strategies. By the 1970s, civilian uses of the Internet began to be noticed gradually. First, universities and research institutions understood the importance of the internet and used this revolutionary technology to exchange information between scientists and researchers in different cities. Afterwards, computer networks in other countries were connected, allowing the internet to reach a global coverage area (Sandkuhl & Lehmann, 2017).

Digital transformation has two concepts in higher education. The first concept, "Digitization," of printed/physical materials (text, picture, sound), is called a computer; it is processed and converted into digital versions. Another concept is "Digitalization," that is, digital transformation to digitize a material as are strategies for doing this, rather than turning them into versions of the transformations in the model (Aybek, 2017). According to Dean defined (1994), the earliest distance learning models were only pre-printed correspondence course-based systems. Using this approach, there was no face-to-face or voice-to-voice interaction between teachers and students because essential telecommunication technologies such as television and the radio were not yet invented.

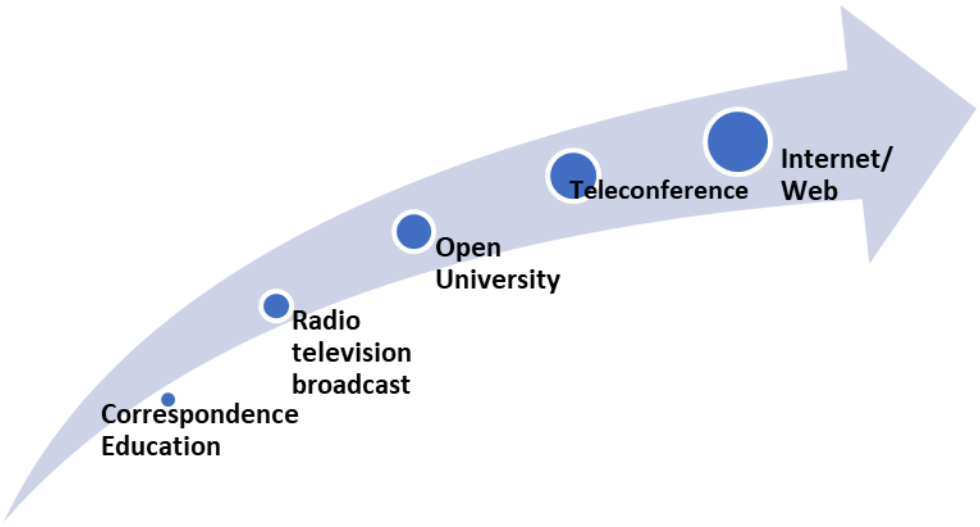

Figure1. History of Distance Education

Source: Moore & Kearsley, 2005

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As seen in Figure 1, as a result of digital transformation in higher education, correspondence education uses a virtual learning environment for web-based learning processes of students from education. In the historical process, the most significant change brought by the 1st Industrial Revolution regarding university education in higher education was the massification of education. It can be defined as a return from elite to non-formal education (Arslan, 2019). Especially with the information and communication technologies provided by the 3rd and 4th Industrial Revolutions in scientific research, studies on computer-aided applications in education and training began (Aybek, 2017).

University leaders are inevitably faced with a new situation: the demanding context of managing and governing higher education institutions. The rapid technological change experienced in the past decade has come alongside significant social and economic changes. This is to be able to achieve a 'shift in the deep structures of consciousness towards the 'development of trans-disciplinary expertise,' which demands new literacies and approaches to learning that are more attuned to the socio-cultural, psychological, and spiritual needs of an emerging global knowledge society (Clarke & Clarke, 2009). It can be argued that these changes must be understood together rather than examined in isolation. These combined societal transformations present higher education with several technical challenges (Bach et al., 2007).

For example, in the early 1990s, university professors were suddenly mandated to establish email accounts. Mostly, there was little pushback to the rhetoric of innovation and time-saving promises made to faculty across universities (Johnston et al., 2018). The impact of emerging technologies on pedagogies has provided opportunities for the stakeholders at higher education institutions. Information and communication technologies influence a variety of approaches to teaching and learning. They offer flexible time and space and the formation of heterogeneous groups, which was not possible in the past (Shonfeld et al., 2021). Universities do not deviate from their historical lines, and continuing their education under the classical university understanding may cause universities to lose competition over time (Arslan, 2019). Universities are complex organizations that value their influence. However, universities are also institutions that shape the future. Its professors, students, and alums lead social transformations and create national identities and cultures. Digital transformation in

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higher education is a comprehensive approach that considers different variables and should be regarded as a multilateral process.

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1.5. Moduuli 1 Oppitunti 5

Aihe: Digipedagogiikan toteuttaminen monimuotoisissa luokkahuoneissa

Kesto: 1 tunti (60 minuuttia)

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Oppimistavoitteet: Tunnin lopussa osallistujat pystyvät:

1) Selittämään, mitä monimuotoinen luokkahuone tarkoittaa.

(2) Luettelemaan monimuotoisen luokkahuoneen perusominaisuudet.

(3) Antamaan joitakin avainesimerkkejä digipedagogiikan toteuttamisesta monimuotoisessa luokkahuoneessa.

Opetusmenetelmät/-tekniikat:

(1) Ryhmäkeskustelut,

(2) Parityöskentely,

(3) Kysymyksiä ja vastauksia osallistujien kesken,

(4) Kysymyksiä ja vastauksia opettajan ja osallistujien kesken.

Oppimis-opetusaktiviteetit:

(1) Ennen oppituntia: Osallistujia pyydetään etsimään tutkimusjulkaisuja monimuotoisten luokkahuoneiden perusominaisuuksista. Ohjaaja antaa opiskelijoille ohjeen ensisijaisten ja toissijaisten lähteiden löytämiseksi verkosta. Lisäksi heidän odotetaan kehittävän muutamia skenaarioita digitaalisen pedagogian integroimiseksi monimuoto-opetustilanteeseen.

(2) Oppitunnin aikana:

a. Ohjaaja aloittaa keskeisten termien hahmottelun taululle, mukaan lukien "monimuotoinen luokka" ja "monimuotoisten luokkahuoneiden peruspiirteet". Kesto noin 10 minuuttia.

b. Jaettuaan kolmeen ryhmään osallistujat kutsutaan keskustelemaan ja kirjoittamaan ylös omat määritelmänsä kyseisistä termeistä. Kesto noin 15 minuuttia.

c. Osallistujat osallistuvat luokkakeskusteluun jatkaakseen määritelmien työstämistä. Mukana on opiskelijoiden keskusteluja, kysymyksiä, vastauksia ja opettajan ohjausta (tarvittaessa väärinkäsitysten ja selvennysten vuoksi). Esimerkiksi he keskustelevat omista tilanteistaan. Kesto noin 20 minuuttia.

(3) Oppitunnin jälkeen ohjaaja käy läpi määritelmäkeskustelun ja luettelee monimuotoisen luokkahuoneen perusominaisuudet, kiinnittäen erityistä huomiota siihen,

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miten digitaalista pedagogiikkaa voidaan käyttää monimuotoisessa luokkahuoneessa. Kesto kolme ryhmää, noin 15 minuuttia.
(4) Oppitunnin jälkeen osallistujien on laadittava tuntisuunnitelma, jossa näytetään, miten digitaalista pedagogiikkaa voidaan käyttää monenlaisissa opiskelijaryhmissä.

Arviointityökalut:

(1) Kysymys-vastaus: Tämän oppitunnin pääarviointityökalu on opiskelijoiden ja ohjaajan sekä osallistujien kesken käytävät kysymykset ja vastaukset.

(2) Essee: Essee-tehtävä antaa palautetta ohjaajalle päätettäessä, kuinka hyvin osallistujat saavuttavat oppitunnin alussa luetellut tavoitteet.

Teoreettinen tausta (englanniksi)

As the world is in a rapid transformation, it can be said that it affects both countries and educational institutions. The infinity of changes and transformations, the unpredictable progress of technology, and the unpredictable course of globalization require that educational institutions not lag behind this change. This change and transformation bring the cultural richness of different lifestyles along with the development of different perspectives in educational institutions.
Diversity is a phenomenon that responds to economic inequalities, refugee flows, sexism, racism, exclusion of the disabled, xenophobia and class discrimination (Apple, 2004). 21st-century skills such as critical thinking, problem solving and creativity are increasingly valued in school organizations. The benefits of diversity in educational outcomes were taken into account. Accordingly, student diversity, while representing the differences between individuals, includes conditions such as race, gender, ethnicity, cognitive level, personality traits, duties of individuals in an institution, education level and background (Paris, 2012). In the field of teacher education, diversity is described partially or superficially. Educational institutions and educators must articulate a vision of teaching and learning in a diverse society in educational institutions and use this vision to systematically guide the fusion of multicultural issues throughout the pre-service curriculum. (Villegas & Lucas, 2002).

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Researchers and educational institutions have historically measured teachers' use or non-use of Information Communication Technology (ICT) by dividing students into non-traditional categories. Demographic characteristics of students such as gender, age, ethnicity, geography, socioeconomic status and educational status have been examined (Clarida et al., 2016).

On the other hand, demographic measures for diversity in schools, such as gender, age, ethnicity, geography, socio-economic status and educational background, once used to determine learner involvement with technology could now be seen as outdated (Johnson, 2011). The researcher argues that it is essential to understand students' characteristics and how they can affect the learning process and outcomes in a diversified classroom.
From a digital pedagogy perspective, diversity is the diversification of classes with a focus on the diversification of curricula. Teachers should include pictures and videos in the classroom that reflect the diversity of their students' faces, cultures, and interests. When choosing instructional videos, they should choose videos that allow students to view cultural diversity as a way to promote new ideas. Additionally, focusing on digital diversity requires teachers to change their approach to assessment dramatically. Teachers should also carefully rethink how they can use modern technology as assessment tools. Meanwhile, it provides an overview of how to start digital diversity education that reflects culturally relevant digital pedagogy (Villegas & Lucas, 2002). Effective teaching toward diversity must consider students' cultural backgrounds and the local contexts in which they live. In this sense, effective teaching must also be informed by sound, well-researched digital pedagogy (Angus & L. C. de Oliveira, 2019).
Teachers can use technology combined with digital pedagogy to meet the needs of diverse students and achieve incredible educational efficiency previously unattainable. Digital pedagogy offers diversified classrooms different opportunities to make learning more equitable and inclusive in terms of teaching the same things in new ways, with a wide variety of online teaching and learning resources. This piece refers to learning methods and a universal learning framework designed to suggest ways teachers can deliver diversity education online (Demirdağ, 2019).

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1.6. Moduuli 1 Oppitunti 6

Aihe: Kulttuurisensitiiviset luokkahuoneet digitaalisessa pedagogiikassa

Kesto: 1 hour (60 minutes)

Oppimistavoitteet: Tunnin lopussa osallistujat pystyvät:

(1) Selittämään, mitä käsite kulttuurisensitiivinen luokkahuone tarkoittaa.

(2) Antamaan esimerkki kulttuurisensitiivisestä luokkahuonekäytännöstä.

(3) Luettelemaan digitaalisen pedagogiikan olennaiset piirteet kulttuurisensitiivisessä opetustyössä.

Opetusmenetelmät/-tekniikat:

(1) Ryhmäkeskustelut,

(2) Parityöskentely,

(3) Kysymyksiä ja vastauksia osallistujien kesken,

(4) Kysymyksiä ja vastauksia opettajan ja osallistujien kesken.

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Oppimis-opetusaktiviteetit:

(1) Ennen oppituntia: Osallistujat lukevat ensin taustatietoja kulttuurisensitiivisistä luokkahuoneista digitaalisessa pedagogiikassa (ks. alla oleva teoreettinen tieto-osio). Heitä kannustetaan myös etsimään tutkimusartikkeleita peruspiirteistä, jotka liittyvät monimuotoisuutta arvostaviin kouluihin, käyttäen verkkoaineistoja. Luennoitsija näyttää osallistujille, kuinka löytää ensisijaisia ja toissijaisia lähteitä verkosta.

(2) Oppitunnin aikana:

a. Aluksi opettaja määrittelee keskeiset käsitteet taululle, mukaan lukien "kulttuuri," "kulttuurisensitiivinen luokkahuone" ja "kulttuuri/koulu." Kesto noin 10 minuuttia.

b. Opiskelijat jaetaan kolmeen ryhmään keskustelemaan ja kirjoittamaan ylös omat määritelmänsä kyseisistä termeistä. Kesto noin 15 minuuttia.

c. Osallistujat osallistuvat luokkakeskusteluun jatkaakseen määritelmien työstämistä. Mukana on opiskelijoiden keskusteluja, kysymyksiä, vastauksia ja opettajan ohjausta (tarvittaessa väärinkäsitysten ja selvennysten vuoksi). Kesto noin 20 minuuttia.

d. Oppitunnin päätteeksi opettaja tiivistää määritelmäkeskustelun ja luettelee perusominaisuudet perinteisille luokkahuoneille sekä luokkahuoneille, jotka ottavat huomioon kulttuuriset erot. Erityistä huomiota kiinnitetään siihen, miten digitaalista johtajuutta voidaan toteuttaa ja ylläpitää luokkahuoneessa, joka ottaa huomioon kulttuuriset erot. Tähän kuuluu myös opetusta ajatuksesta, että koulutus on osa yhteiskuntaa ja kulttuuria. Kesto noin 15 minuuttia.

(3) Oppitunnin jälkeen osallistujia pyydetään valmistelemaan yhden oppitunnin essee, jossa he kuvaavat ajatuksiaan digitaalisesta johtajuudesta kulttuurisensitiivisessä luokkahuoneessa ja siitä, miten oppilaat digitaalisessa luokkahuoneessa voivat reagoida tällaisiin herkkyyksiin.

Arviointityökalut:

(1) Kysymykset ja vastaukset: Tämän oppitunnin ensisijainen arviointityökalu ovat kysymykset ja vastaukset opiskelijoiden kesken sekä opettajan ja osallistujien kesken.

(2) Essee: Essee-tehtävä antaa palautetta opettajalle osallistujien tavoitteiden saavuttamisen arvioimiseksi.

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Teoreettinen tausta (englanniksi):

In parallel with changing student cultures, diversity, and different characteristics, universities transfer their professional skills to digital environments through educational and educational backgrounds, having more access and sharing with their students and increasing their professional efficiency (Arslan & Doğan, 2020). Teachers, students, and other education stakeholders from different cultures and countries interact, learn together, and form relationships without the stereotypes influenced by external appearances in education organizations (Shonfeld et al., 2021). Students come to school in many different ways to get to know the world. Their cultural backgrounds and experiences mean that each class has its unique knowledge. Unfortunately, many standardized curricula adopt a one-size-fits-all syllabus (Angus & Oliveira, 2012).

In this regard, the universal design of culturally appropriate digital pedagogy for students' framework situates teaching and learning in a context that gives all students an equal opportunity to teach and learn. The aim is to use digital pedagogy with culturally sensitive various teaching methods to remove barriers to learning and build flexibility that accommodates every student's strengths and needs (Villegas & Lucas, 2002). Digital technologies may help teachers create or adapt activities that cater to and support their culturally diverse learners. Teachers can focus on their students' needs and cultural differences by using technology to personalize learning. Teachers need to learn about their students and their cultures, know what digital pedagogy is available, and how it can be utilized to differentiate activities and support their students (Shonfeld et al., 2021).

As Villegas and Lucas (2002) point out, culturally sensitive teaching is more than just a set of techniques or a tailor-made curriculum. Teachers "have a high level of sociocultural awareness, have affirming views of students from diverse backgrounds, see themselves as agents of change, understand and adopt constructivist views of learning and teaching, and recognize students in their classrooms." Although it is not easy to promote innovations in schools, innovation must be part of the educational system's vision and

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values to change culture and pedagogies. The planning of digital pedagogical activities begins by considering the pedagogical orientation (Väätäjä & Ruokamo, 2021).

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e-teach
Upskilling Digital Pedagogy

Moduuli 2
Digitaalisen pedagogiikan teoriat ja suunnitteluperiaatteet
VUB

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MODUULI 2: DIGITAALISEN PEDAGOGIIKAN TEORIAT JA SUUNNITTELUPERIAATTEET

Marta Lucchetti & Chang Zhu, Vrije Universiteit Brussel

SISÄLTÖ

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2.1. Moduuli 2 Oppitunti 1

Aihe: Keskeisimmät digitaalisen pedagogiikan teoriat

Kesto: 2 tuntia (120 minuuttia)

Oppimistavoitteet: Tunnin lopussa osallistujat pystyvät:

(1) Ymmärtämään oppimisteorioiden merkityksen digitaalisessa pedagogiikassa
(2) Tuntemaan jokaisen oppimisteorian pääpiirteet
(3) Selittämään suurimpien oppimisteorioiden erot
(4) Tarjoamaan esimerkkejä oppimisteorioiden käytöstä digitaalisessa pedagogiikassa

Opetusmenetelmät/-tekniikat:
(1) Esitys PowerPointilla
(2) Ryhmäkeskustelu
(3) Ryhmäyhteistyö Miro-alustalla
(4) Kysymys-vastaus -vuoropuhelu opettajan ja osallistujien välillä
(5) Käytännön tehtävä

Oppimis-opetusaktiviteetit:

(1) Ennen oppituntia: Opettajia ja tulevia opettajia (osallistujia) pyydetään lukemaan e-teach-hankkeen taustajulkaisun (Knowledge paper) toinen luku moduulin sisältöön perehtymiseksi.

(2) Oppitunnin aikana:

a. Tunti alkaa lämmittelyllä, jossa ohjaajat esittävät muutamia avoimia kysymyksiä testatakseen osallistujien alkutietämystä ja ymmärrystä oppimisteorioista ja niiden käytöstä digitaalisessa pedagogiikassa (esim. Mitä on kognitivismi yksinkertaisesti? Mikä oppimisteoria on sinulle tutuin? Mikä oppimisteoria mielestäsi soveltuu parhaiten digitaaliseen pedagogiikkaan?). Tähän käytetään Mentimeteriä tai vastaavaa työkalua. Opettaja jakaa Mentimeter-linkin osallistumisen mahdollistamiseksi ja jakaa näytön, jotta kaikki voivat nähdä vastaukset reaaliajassa. Kesto noin 20 minuuttia.

b. Opettaja esittelee jokaisen seuraavista oppimisteorioista teoreettisen taustan ja esimerkit: Behaviorismi, Kognitivismi, Konstruktivismi, Sosiaalinen konstruktivismi ja Konnektivismi. Erityisesti opettaja linkittää nämä oppimisteoriat digitaaliseen pedagogiikkaan selittämällä, miten teknologiaa voidaan sisällyttää opetukseen näiden teorioiden viitekehyksenä. Kesto noin 30 minuuttia.

c. Osallistujat ohjataan linkin avulla jaettuun työtilaan "Miro"-alustalla. Opettaja selittää lyhyesti, miten käyttää 'Miroa' ja ryhmäharjoitus, joka seuraa. 'Miro'-taululla on 5 erillistä työtilaa (lohkoa), joita kutsutaan nimillä Behaviorismi, Kognitivismi, Konstruktivismi, Sosiaalinen konstruktivismi ja Konnektivismi. Jokaisen lohkon (teorian) alle annetaan joitakin ohjauskysymyksiä (esim. Konstruktivismi: Miten konstruktivismia voidaan

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soveltaa digitaalisessa pedagogiikassa? Mitä työkaluja voidaan käyttää tiedon rakentamisen helpottamiseksi?). Lisäksi jokaisen lohkon alla on 'sticky pack' -laput, joita osallistujat voivat käyttää ideoiden keräämiseen. Selitys kestää noin 5 minuuttia.

d. Osallistujat jaetaan 5 ryhmään ja kutsutaan 5 ryhmähuoneeseen. Jokaista ryhmää pyydetään keskustelemaan 5 pääoppimisteorioiden ominaisuuksista ja sovelluksista digitaalisessa pedagogiikassa. Ryhmän keskustelu tapahtuu vuorovaikutteisesti ja lisäämällä 'digitaalisia muistilappuja' 'Miroon' kunkin ryhmän lohkon alle. Kesto noin 25 minuuttia.

e. Sen jälkeen kaikki osallistujat kutsutaan takaisin päähuoneeseen, ja jokainen ryhmä jakaa pääkeskustelupisteet, jotka nousivat esiin ryhmäkeskusteluista. Vuorovaikutusta ja reflektointia kannustetaan kaikkien ryhmien kesken jaettavan tiedon saavuttamiseksi. Kesto noin 30 minuuttia.

f. Oppitunnin lopussa opettaja kysyy, onko osallistujilla kysymyksiä ja selittää käytännön tehtävät, jotka seuraavat. Tehtävät koostuvat muutamien kysymysten vastaamisesta keskustelufoorumilla ja muiden kommentoimisesta foorumilla. Lisäksi opettaja selittää, miten moduuli on rakennettu. On viisi muuta alimoduulia, joista kukin keskittyy tiettyihin kehyksiin ja suunnitteluperiaatteisiin digitaalisessa oppimisessa. Luettavaa ja interaktiivista materiaalia (esim. videoita) tarjotaan Canvassa, ja kunkin alimoduulin lopussa ehdotetaan keskustelufoorumia (määräaikoineen). Tämä kestää noin 10 minuuttia.

Arviointityökalut:

(1) Mentimeteria (tai vastaavaa työkalua) käytetään formatiivisena arviointina testaamaan opiskelijoiden tietämystä istunnon alussa (ryhmäarviointi - anonyymi)

(2) Harjoitus (keskustelufoorumi oppimisalustalla) toimii arviointityökaluna (yksilöarviointi - tunnistettavissa)

Teoreettinen tausta (englanniksi)

Several theories, approaches and frameworks have been developed to investigate the design principles supporting Digital Pedagogy. Some of the main learning theories and approaches to digital pedagogy are represented by Behaviorism, Cognitivism, Constructivism, Social Constructivism, and Connectivism. Importantly, these theories should be viewed as complementary rather than competing, as each approach captures certain aspects of teaching and learning. Thus, knowledge of several theories and perspectives is critical when attempting to select the most appropriate and effective approach in relation to the context, activity and situation at hand.

Behaviourism is a theory of learning that originated in the early 1900s based on the work of John B. Watson, based on the classical or Pavlovian conditioning model, anchored in the stimulus-response schema (Schunk, 2012). According to Behaviorism learning is nothing else than the acquisition and strengthening of responses. On the

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pedagogical level, Behaviorist hypotheses have led to focus only on what is objectively observable and measurable (Kesim & Altınpulluk, 2015). As a result, the main learning principles according to Behaviorism are contiguity, repetition and reinforcement. Although this approach to learning is often considered outdated nowadays, it provided the theoretical foundation for the development of teaching machines and programmed instruction (Ertmer & Newby, 2013). Moreover, it still represents one of the main theoretical approaches in foreign language teaching (e.g. audio-lingual method), quiz-making (e.g. multiple choice quiz) and gamification (e.g. badges) (Kesim & Altınpulluk, 2015). Finally, it is often used to reinforce and weaken undesired behaviour (e.g. feedback, recognition and grades) (Clark, 2018).

Cognitivism emerged during the mid-20th century as a reaction to Behaviorists' assumptions of the learning process depending on stimulus-response training. Cognitive learning theories see learning as the active pursuit of information, in contrast to the passive memorization of notions (Greitzer, 2002). Thus, Cognitivism shifted the focus from observable behavior to the mental processes underlying how people access, interpret, integrate, process, organize and manage new information (Schunk, 2012). Cognitivism is greatly used in digital pedagogy to enhance students' engagement and self-regulated learning, by for example, providing several options, resources and formats (audio, visual, verbal modes) which reflect students' abilities, needs and interests (Bandura, 1991; Johnson & Davies, 2014). This becomes particularly important when students learn in an online or blended learning environment, as they often study at their own pace and receive less direct support from their instructors. Finally, several theories such as the Cognitive Theory of Multimedia Learning (CTML) and Cognitive Load Theory (CLT) drawing from cognitivism offer important guidelines for creating a meaningful digital learning experience.

Constructivism emerged in the mid-1990s from Piaget's and Vygotsky's theories of human development. Constructivists believe that knowledge is essentially subjective in nature as it is constructed from our perceptions, experiences and interaction with others. According to this learning theory, we construct new knowledge rather than simply acquiring it by memorization or passive transmission (Schunk, 2012). Constructivists believe that learning is achieved by assimilating information, relating it to our existing knowledge, and constructing new meaning and knowledge (Ertmer & Newby, 2013). Moreover, constructivism stresses the importance of authentic, complex and meaningful learning experiences that resemble real-life challenges (Amineh & Asl, 2015). Constructivism is one of the most used theories in digital pedagogy. This is because technology and the Internet provide students numerous opportunities to reflect, question, critically evaluate, connect concepts and experiences and apply the knowledge by creating tangible products.

Social constructivism draws on Constructivist assumptions but it argues that students can best construct their meaning and knowledge through discussion and social interaction, which allow us to test and challenge our own understandings with those of others. Thus, pedagogical approaches that are based on Socio-Constructivism emphasize learning by doing, collaborating and reflecting with others (Amineh & Asl,

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2015). The wide range of digital tools to support collaboration and authentic tasks makes socio-constructivism a particularly suitable approach to digital pedagogy (Mbati, 2012). For example, online tools and software such as collaborative whiteboards, online collaborative documents and tools and discussion boards can foster collaboration and problem-based learning in a way beyond what is possible in a traditional classroom.

Connectivism was introduced in 2004 by George Siemens (2004). This learning theory argues that students in the 21st Century should learn how to select and connect the multitude of information available nowadays. The theory is based on the idea that technology has increased the speed of our access to information and that education should take advantage of our constant connection to help students learn, collaborate and share their ideas through different information sources, including blogs, social media and global knowledge libraries.

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2.2. Moduuli 2 Oppitunti 2

Aihe: Kognitiivisen kuormituksen teoria (Cognitive Load Theory, CLT) digitaalisessa pedagogiikassa

Kesto: Noin 1 tunti (asynkroninen)

Oppimistavoitteet: Tunnin lopussa osallistujat pystyvät:

1. Ymmärtämään Kognitiivisen Kuormituksen Teorian periaatteet.

2. Tunnistamaan strategiat kognitiivisen kuormituksen vähentämiseksi digitaalisessa pedagogiikassa.

3. Laatimaan suunnitelman Kognitiivisen kuormituksen teorian sisällyttämiseksi omaan opetukseen.

Opetusmenetelmät/-tekniikat:

(1) Luentovideoiden esittely (nauhoitettu)

(2) Interaktiivinen materiaali (videot, kuvat ja verkkosivustot) oppimisalustan sivulla

(3) Ryhmäkeskustelu (foorumi)

(4) Käytännön tehtävä

Oppimis-opetusaktiviteetit:

(1) Ennen oppituntia: Osallistujat kutsutaan lukemaan "Kognitiivisen Kuormituksen Teoria (KKT)" eteach-hankkeen taustajulkaisusta (Knowledge paper) kappaleesta 2 tutustuakseen tämän moduulin sisältöön.

(2) Oppitunnin aikana:

a. Videoluento (30 minuuttia): Kognitiivisen kuormituksen teorian (KKT) aihe ja sen merkitys digitaaliselle pedagogiikalle esitellään. KKT:n perusperiaatteet selitetään. Esimerkkejä digitaalisista pedagogiikkaaktiviteeteista, jotka sisältävät KKT:n, esitellään.

b. Oppimisalustalla, jossa luento esitetään, on myös resursseja KKT:n syvällisempään tutkimiseen (videoita, kuvia ja linkkejä verkkosivustoille).

(3) Keskustelufoorumi (30 minuuttia): Osallistujia pyydetään keskustelemaan siitä, miten he voivat soveltaa KKT:ta omaan opetuskäytäntöönsä. Erityinen painotus on kannustaa osallistujia jakamaan ideoita ja strategioita.

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(4) Osallistujia pyydetään laatimaan suunnitelma KKT:n sisällyttämiseksi omaan opetuskäytäntöönsä, ladattavaksi oppimisalustalle tiedostona.

Arviointityökalut:

(1) Oppilaiden vastaukset ja vuorovaikutukset keskustelufoorumilla oppimisalustalla arvioidaan oppimisalustalla ensimmäisten kahden oppimistavoitteen saavutusten perusteella (1. Ymmärrä Kognitiivisen Kuormituksen Teorian periaatteet 2. Tunne strategiat kognitiivisen kuormituksen vähentämiseksi digitaalisessa pedagogiikassa).
(2) Käytännön tehtävä antaa palautetta opettajille päätettäessä, kuinka hyvin osallistujat saavuttivat kolmannen tavoitteen (3. Laadi suunnitelma KKT:n sisällyttämiseksi omaan opetuskäytäntöön).

Teoreettinen tausta (englanniksi)

What is Cognitive Load Theory?

Cognitive Load Theory (CLT) is an instructional design theory that reflects the way that we process information (Sweller et al., 1998). This theory builds upon the well-known human information processing model, which explains how the human brain processes and stores information (Figure 1). According to this model, memory consists of three main parts: sensory memory, working memory and long-term memory. The first stage of the information processing model is Sensory Memory, which filters out most of the incoming stimuli and helps decide what is important enough to direct attention to. Then, the information from the sensory memory passes into the working memory, where it is either processed or discarded. Working memory is what students use while paying attention to a lesson and thus plays an essential role in students' learning. However, working memory has a limited capacity, both in terms of capacity and duration. The limited amount of information that memory can hold at one time is called "Cognitive load". These limitations will, under some conditions, lead to a depletion of cognitive resources and impede learning. For instance, some of the factors that may affect the cognitive load in working memory and cognition are the amount of information taught at once, the simplicity/complexity of the interface, or inadequate instructional methods. Thus, instructors should be familiar with the basic principles of the Cognitive Load Theory (CLT) as it helps them consider not only how learners process knowledge, but also how to reduce the Cognitive Load, which is essential for processing and encoding information in Long-Term Memory.

Figure 1: Human Information Processing Model

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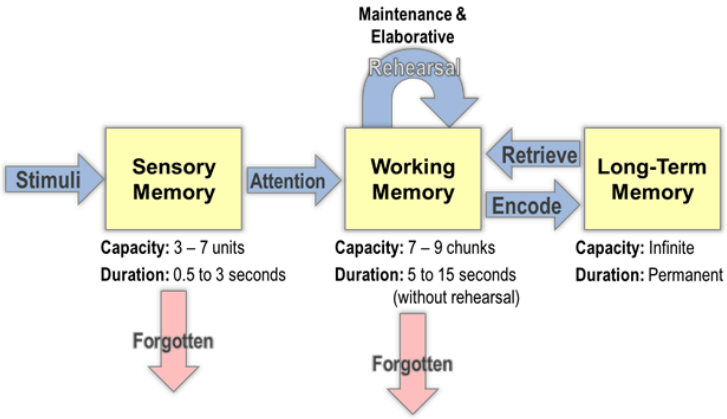

YouTube video about John Sweller explaining the CLT that can be incorporated on Canva: https://www.youtube.com/watch?v=gOLPfi9Ls-w&ab_channel=ResearchED

According to Sweller et al. (1998), there are three different forms of cognitive load:

- **Intrinsic cognitive load (content-based):** Intrinsic load indicates the inherent difficulty in learning new concepts and tasks, especially when the amount and complexity of the information or task presented are not adequate to the expertise of the learner. For example, if the learner is presented with a large number of high interactivity between elements, the intrinsic load will be higher than in the case of low element interactivity.

- **Extraneous cognitive load (presentation-based):** Extraneous cognitive load refers to the instructional materials presented that do not directly contribute to learning. An example of extraneous cognitive overload is using a graph that contains unnecessary information and thus, requires extra information processing. On the other hand, a graphic organizer with meaningful items of information contained in the text and the links between them can reduce the extraneous cognitive load.

- **Germane cognitive load (information consolidation-based)**: Germane cognitive load refers to the amount of learners' cognitive resources used to acquire and store new knowledge in long-term memory and is influenced by information and activities that foster the learning process. For example, presenting organised information through a chart to explain complex concepts makes it easier to learn and remember the information.

How to applying the Cognitive Load Theory in Digital Pedagogy?

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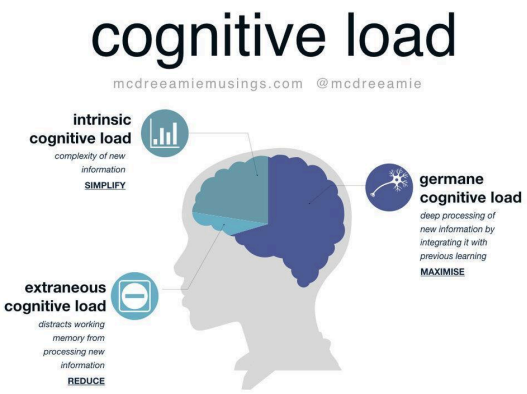
Depending on its nature, cognitive load can either be helpful or detrimental to learning. Hence, for an effective learning process, the instructor should:

- Simplify intrinsic cognitive load
- Reduce extraneous cognitive load
- Maximise germane cognitive load.



The cognitive load theory suggests several guidelines that should be taken into consideration to simplify the intrinsic cognitive load, eliminate or reduce the extraneous cognitive load and maximise the germane cognitive load. These guidelines are especially useful in digital pedagogy, where learners can easily experience a cognitive load due to the high interactivity of e-learning environments (e.g. graphics, audio narration, animations, hyperlinks). Moreover, often students are encouraged to navigate freely the course pages so information might not be linearly organized and presented. Therefore, students might more easily experience an intrinsic, extraneous, and germane load when the design of learning environments is not adequate to the expertise of learners or does not take into account how the human brain processes and stores information.

Thus, when designing an online course, it's important to keep the Cognitive Load Theory in mind in order to create effective and engaging instructional materials. Here are some ways to apply the Cognitive Load Theory in digital pedagogy:

Minimize extraneous load (the mental effort that is necessary for learning):

- Use simple and clear language and visuals
- Avoid using irrelevant or distracting graphics or animation
- Present information in small chunks and provide clear explanations
- Use meaningful examples and analogies to make the content easier to understand

Simplify intrinsic load (the mental effort required to process the information being presented):

- Break complex information into smaller, more manageable pieces

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- Provide clear explanations and use analogies to help learners understand the content
- Use relevant examples and real-life situations to make the information more meaningful
- Provide opportunities for learners to interact with the information, such as through hands-on activities or discussions

Maximize germane load (the mental efforts required to acquire and store new knowledge):

- Encourage active learning, where learners are engaged in the process of acquiring and applying information
- Use visuals and other multimedia elements to help reinforce the audio or written content
- Provide opportunities for learners to reflect on what they have learned, such as through quizzes or writing assignments
- Use collaboration and peer review activities to help learners build a deeper understanding of the content

By taking these guidelines into consideration, you can help to minimize the extraneous cognitive load, simplify the intrinsic cognitive load, and maximize the germane cognitive load in your online course. This will help to ensure that learners are able to process and retain the information more effectively, leading to better learning outcomes.

For extra reading resources , participants can download the report: Cognitive load theory: Research that teachers really need to understand through the link: https://education.nsw.gov.au/about-us/educational-data/cese/publications/literature-reviews/cognitive-load-theory

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2.3. Moduuli 2 Oppitunti 3

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Aihe: Multimediaoppimisen kognitiivinen teoria (Cognitive Theory of Multimedia Learning, CTML) digitaalisessa pedagogiikassa

Kesto: noin 1 tunti (asynkroninen)

Oppimistavoitteet: Tunnin lopussa osallistujat pystyvät:

1. Ymmärtämään Kognitiivisen Multimediaoppimisen Teorian (CTML) periaatteet.

2.Tunnistamaan Kognitiivista Multimediaoppimista tukevat opetusmuotoiluperiaatteet digitaalisessa pedagogiikassa.

3. Laatimaan suunnitelman CTML:n sisällyttämiseksi omaan opetukseen.

Opetusmenetelmät/-tekniikat:

(1) Luentovideoiden esittely (nauhoitettu)

(2) Interaktiivinen materiaali (videot, kuvat ja verkkosivustot) oppimisalustan sivulla

(3) Ryhmäkeskustelu (foorumi)

(4) Käytännön tehtävä

Learning-Teaching Activities:

(1) Ennen oppituntia: Osallistujia kutsutaan lukemaan "Kognitiivisen Multimediaoppimisen Teoria (CTML)" digitaalisen pedagogikkan tietopaperin kappaleesta 2 tutustuakseen tämän moduulin sisältöön.

(2) Oppitunnin aikana:

Videoluento (30 minuuttia): Kognitiivisen Multimediaoppimisen Teorian (CTML) aihe ja sen merkitys digitaaliselle pedagogiikalle esitellään. CTML:n perusperiaatteet selitetään. Esimerkkejä digitaalisista pedagogiikkaaktiviteeteista, jotka sisältävät CTML:n, esitellään. Oppimisalustalla, jossa luento esitetään, on myös resursseja CTML:n syvällisempään tutkimiseen (videoita, kuvia ja linkkejä verkkosivustoille).

Keskustelufoorumi (30 minuuttia): Osallistujia pyydetään keskustelemaan siitä, miten he voivat soveltaa CTML:ää omaan opetuskäytäntöönsä. Erityinen painotus on kannustaa osallistujia jakamaan ideoita ja strategioita.

Osallistujia pyydetään laatimaan suunnitelma CTML:n sisällyttämiseksi omaan opetuskäytäntöönsä, joka ladataan oppimisalustalle tiedostona.

Arviointityökalut:

(1) Oppilaiden vastauksia ja vuorovaikutusta keskustelufoorumilla oppimisalustalla arvioidaan oppimisalustalla perustuen ensimmäisten kahden oppimistavoitteen saavutuksiin (1. Ymmärrä Kognitiivisen Multimediaoppimisen Teorian (CTML) periaatteet; 2. Tunnista opetusmuotoiluperiaatteet, jotka tukevat CTML:ää digitaalisessa pedagogiikassa).

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(2) Käytännön tehtävä antaa palautetta opettajille päätettäessä, kuinka hyvin osallistujat saavuttivat kolmannen tavoitteen (3. Laadi suunnitelma CTML:n sisällyttämiseksi omaan opetuskäytäntöönsä).

Teoreettinen tausta (englanniksi)

What is Cognitive Theory of Multimedia Learning (CTML)?

The Cognitive Theory of Multimedia Learning (CTML) is an influential theory of educational multimedia design developed by Richard E. Mayer in 2005, a psychologist and researcher in the field of multimedia learning. The theory is based on how people learn from multimedia sources such as audio, video, and graphics. The theory states that to effectively learn from multimedia sources, the learner must pay attention to the material, make sense of the material, and retain the material.

The theory is based on cognitive research in multimedia learning, which suggests that when we learn from multimedia sources, we process information differently than when we learn from text-based sources. According to Mayer, there are three components to multimedia learning: dual-channel processing, limited working memory capacity, and active learning.

The first component of CTML is dual-channel processing. This means that learners process information from audio and visual channels separately. For example, when we watch a video, we process the audio and visual information separately. This means that we can pay attention to the audio and visual information at the same time. This is important because by processing information from different channels, we are able to better understand and remember the material.

The second component of CTML is limited working memory capacity. Working memory is the short-term memory we use to process and store information. Because of its limited capacity, it is important for multimedia tasks to be designed in such a way that does not overwhelm working memory. This means that multimedia tasks should be designed with limited amounts of text and visuals, and should be organized into meaningful chunks.

The third component of CTML is active learning. This means that learners should be actively involved in the learning process. This can be done by using interactivity, such as simulations and games, or by having the learner complete tasks or answer questions. Active learning encourages learners to think critically and interact with the material, thus improving learning.

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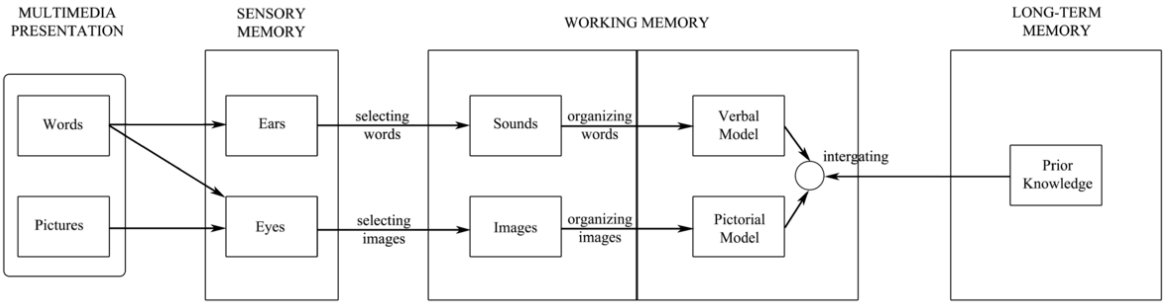

Cognitive Theory of Multimedia Learning (CTML) (Mayer, 2005)

How to apply Cognitive Theory of Multimedia Learning (CTML) in Digital Pedagogy?

Mayer (2009) identifies 12 multimedia instructional principles that should guide the design of multimedia presentations. Mayer's 12 multimedia instructional principles are the cornerstone of the Cognitive Theory of Multimedia Learning (CTML). These principles are based on cognitive science research and provide guidelines for designing effective multimedia instructional materials.

Multimedia Principle: Use words and pictures instead of just words.

Explanation: This principle suggests that multimedia instructional materials should include both words and pictures to help learners make connections between new information and what they already know. The use of words and pictures also enhances learners' attention and motivation to learn.

Coherence Principle: Reduce extraneous cognitive load.

Explanation: This principle suggests that multimedia instructional materials should minimize extraneous cognitive load, which is the load that is not related to the task at hand. This can be done by eliminating extraneous information that is not necessary for learning and by organizing the information in a clear and coherent manner.

Modality Principle: Present words as audio rather than visual text.

Explanation: This principle suggests that multimedia instructional materials should present words as audio rather than visual text because audio processing is more efficient than visual processing. This helps learners attend to the important information and reduces the cognitive load of reading text.

Redundancy Principle: Avoid presenting the same information in multiple forms.

Explanation: This principle suggests that multimedia instructional materials should avoid presenting the same information in multiple forms because it can lead to cognitive overload and negatively impact learning.

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Temporal Contiguity Principle: Present words and pictures together.

Explanation: This principle suggests that multimedia instructional materials should present words and pictures together to help learners make connections between the two. This helps learners understand the information more effectively and retain it for longer periods.

Spacial Contiguity Principle: : Place words near the relevant pictures.

Explanation: This principle suggests that multimedia instructional materials should place words near the relevant pictures to help learners make connections between the words and the pictures. This helps learners understand the information more effectively and retain it for longer periods. When words and pictures are spatially separated, learners must work harder to make connections between the words and the pictures, leading to increased cognitive load and decreased learning outcomes.

Segmenting Principle: Divide longer materials into smaller segments.

Explanation: This principle suggests that multimedia instructional materials should be divided into smaller segments to help learners process the information more easily. This helps learners focus on the information and retain it for longer periods.

Pre-training Principle: Provide background knowledge.

Explanation: This principle suggests that multimedia instructional materials should provide learners with background knowledge before they start learning. This helps learners understand the information more effectively and reduces the cognitive load of learning new information.

Personalization Principle: Address learners by name.

Explanation: This principle suggests that multimedia instructional materials should address learners by name to help learners feel that the materials are tailored to their needs. This also helps learners feel more motivated and engaged in the learning process.

Voice Principle: Use a conversational tone.

Explanation: This principle suggests that multimedia instructional materials should use a conversational tone to help learners feel that the materials are approachable and easy to understand. This also helps learners feel more motivated and engaged in the learning process.

Signaling Principle: Highlight important information.

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Explanation: This principle suggests that multimedia instructional materials should highlight important information to help learners focus on the most important information. This helps learners understand the information more effectively and retain it for longer periods.

Image Principle: : Use relevant graphics and images to help reinforce the audio voiceover, especially when teaching abstract concepts.

Explanation: This principle suggests that instead of relying solely on talking head videos, instructional materials should incorporate relevant animations and visuals to help reinforce the audio and make the information easier to understand. This approach has been found to be more effective in teaching and retaining abstract concepts, compared to a traditional talking head video. However, it is important to note that talking heads can still have a role in establishing credibility and trust with the instructor at the beginning of the learning experience. The principle highlights the need to strike a balance between using talking head videos and incorporating relevant visuals to enhance the learning experience.

In conclusion, Mayer's 12 multimedia instructional principles provide a useful framework for designing effective multimedia instructional materials. By following these principles, teachers can create materials that help learners construct their own knowledge and achieve better learning outcomes. These principles are particularly important in an online or blended course, where multimedia materials are a key component of the learning experience. Importantly, these principles must be considered interdependent. For example, the use of text and figures in the same presentation produces different effects depending on whether or not the materials are relevant for understanding (principle of coherence) or redundant (principle of redundancy). Therefore, the principles should not be viewed as absolute rules that have to be applied equally in every situation. They are guidelines that should be adjusted depending on the intended audience, the goals of the instruction, and the conditions such as the expertise level of the learner.

YouTube video on the 12 Multimedia Instructional Principles:
https://www.youtube.com/watch?v=R6yUsUkePVI&ab_channel=MikeTyler

Website about Mayer's 12 multimedia instructional principles:
https://waterbearlearning.com/mayers-principles-multimedia-learning/

Lähteet

Mayer, R. E. (2005). Cognitive Theory of Multimedia Learning. In R. E. Mayer (Ed.), *The Cambridge handbook of multimedia learning* (pp. 31–48). Cambridge University Press. https://doi.org/10.1017/CBO9780511816819.004

2.4. Moduuli 2 Oppitunti 4

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Aihe: Bloomin digitaalinen taksonomia digitaalisessa pedagogiikassa

Kesto: Noin 1 tunti (asynkroninen)

Oppimistavoitteet: Tunnin lopussa osallistujat pystyvät:

1.Ymmärtämään Bloomin digitaalisen taksonomian periaatteet digitaalisessa pedagogiikassa.

2.Tunnistamaan Bloomin digitaalista taksonomiaa tukevat periaatteet digitaalisessa pedagogiikassa.

3.Laatimaan suunnitelman Bloomin digitaalisen taksonomian sisällyttämiseksi omaan opetukseen.

Opetusmenetelmät/-tekniikat:

(1) Luentovideoiden esittely (nauhoitettu)

(2) Interaktiivinen materiaali (videot, kuvat ja verkkosivustot) oppimisalustan sivulla

(3) Ryhmäkeskustelu (foorumi)

(4) Käytännön tehtävä

Oppimis-opetusaktiviteetit:

Ennen oppituntia: Osallistujia kutsutaan lukemaan "Bloomin digitaalinen taksonomia digitaalisessa pedagogiikassa" digitaalisen pedagogiikan tietopaperin kappaleesta 2 tutustuakseen tämän moduulin sisältöön.

Oppitunnin aikana:

Videoluento (30 minuuttia): Bloomin digitaalisen taksonomian aihe ja sen merkitys digitaaliselle pedagogiikalle esitellään. Bloomin digitaalisen taksonomian perusperiaatteet selitetään. Esimerkkejä digitaalisista pedagogiikkaaktiviteeteista, jotka sisältävät Bloomin digitaalista taksonomiaa, esitellään. Oppimisalustalla, jossa luento esitetään, on myös resursseja Bloomin digitaalisen taksonomian syvällisempään tutkimiseen digitaalisessa pedagogiikassa (videoita, kuvia ja linkkejä verkkosivustoille).

Keskustelufoorumi (30 minuuttia): Osallistujia pyydetään keskustelemaan siitä, miten he voivat soveltaa Bloomin digitaalista taksonomiaa omaan opetuskäytäntöönsä. Erityinen painotus on kannustaa osallistujia jakamaan ideoita ja strategioita.

Osallistujia pyydetään laatimaan suunnitelma Bloomin digitaalisen taksonomian sisällyttämiseksi omaan opetuskäytäntöönsä, joka ladataan oppimisalustalle tiedostona.

Arviointityökalut:

(1) Oppilaiden vastauksia ja vuorovaikutusta keskustelufoorumilla oppimisalustalla arvioidaan oppimisalustalla perustuen ensimmäisten kahden oppimistavoitteen saavutuksiin (1. Ymmärrä Bloomin digitaalisen taksonomian periaatteet digitaalisessa

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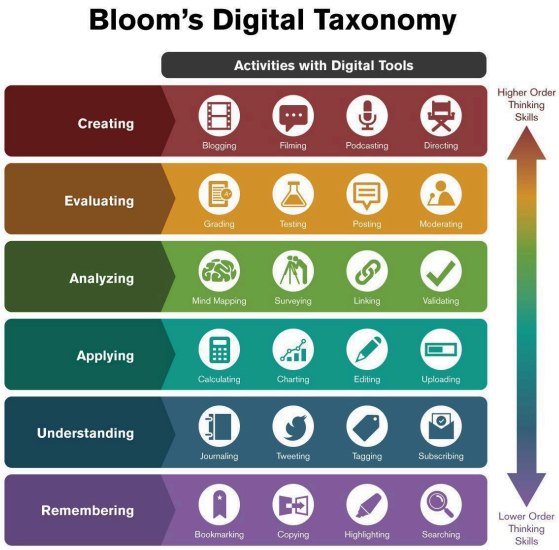
pedagogiikassa; 2. Tunnista opetusmuotoiluperiaatteet, jotka tukevat Bloomin digitaalista taksonomiaa digitaalisessa pedagogiikassa).

(3) Käytännön tehtävä antaa palautetta opettajille päätettäessä, kuinka hyvin osallistujat saavuttivat kolmannen tavoitteen (3. Laadi suunnitelma Bloomin digitaalisen taksonomian sisällyttämiseksi omaan opetuskäytäntöönsä).

Teoreettinen tausta (englanniksi)

Bloom's Digital Taxonomy

Bloom's Taxonomy is an educational framework that can help teachers assess student learning in an effective and meaningful way. It is a cognitive structure that was developed by Bloom et al. in 1956, and later revised by Anderson et al. in 2001 to include a new level of learning, known as 'creating'. The Digital Bloom's Taxonomy (Churches, 2010) is a revised version of Bloom's original taxonomy, taking into account the increasing use of digital technologies in the classroom. This taxonomy is divided into six levels, from 'remembering' to 'creating', and each level has specific activities or tasks that can be done in a digital environment to facilitate learning.



Bloom's Digital Taxonomy *Infographic Credit: Ron Carranza*

The first level, 'remembering', refers to the recalling of specific information and activities that can be used to foster this level of learning include book-marking, highlighting, bullet-pointing, flashcards, online quizzes/tests, searching, and group networking.

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The second level is ‘understanding’, which requires students to be able to explain, interpret, summarise, and compare certain concepts. Advanced searching, annotating, blog journaling, tweeting, tagging, commenting, and subscribing can all help foster understanding.

The third level is ‘applying’, which involves the use of learning material to create models, presentations, interviews, or simulations. Calculating, charting, presenting, editing, uploading, playing, and sharing are all possible activities that can be used.

The fourth level of Bloom’s Taxonomy is ‘analyzing’, which is defined as the process of making connections among ideas, concepts, or determining how the parts relate or interrelate between each other or to an overall structure or purpose. Mind mapping, surveying, linking, and validating are all activities that can be done to help promote this level of learning.

The fifth level is ‘evaluating’, which involves examining evidence to make judgements based on certain criteria. Grading, testing, posting/commenting, and moderating are all digital activities that can be used to help students critically evaluate.

Finally, the last level of Bloom’s Taxonomy is ‘creating’, which is the process of reorganizing previously learned material and the production of new and original work. Blogging, presenting, filming, vodcasting, podcasting, videocasting, screencasting, directing, and producing are all activities that can be used to foster this level of learning.

In conclusion, Bloom’s Taxonomy is a valuable educational framework that can be used to assess student learning and ensure that they are mastering the material they are being taught. It is also important to note that there are digital activities that can be used to facilitate each level of this cognitive structure. By taking advantage of these activities and tools, teachers can ensure students are receiving the best possible education and learning experience.

Lähteet:

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2.5. Moduuli 2 Oppitunti 5

Aihe: Tutkimusyhteisö **(**Community of Inquiry (CoI)) digitaalisessa pedagogiikassa

Kesto: noin 1 tunti (asynkroninen)

Oppimistavoitteet: Tunnin lopussa osallistujat pystyvät:

1.Ymmärtämään CoI:in periaatteet digitaalisessa pedagogiikassa.

2.Tunnistamaan opetusmuotoiluperiaatteet, jotka tukevat CoI:in viitekehystä digitaalisessa pedagogiikassa.

3.Laatimaan suunnitelman CoI:in sisällyttämiseksi omaan opetukseen.

Opetusmenetelmät/-tekniikat:

(1) Luentovideoiden esittely (nauhoitettu)

(2) Interaktiivinen materiaali (videot, kuvat ja verkkosivustot) oppimisalustan sivulla

(3) Ryhmäkeskustelu (foorumi)

(4) Käytännön tehtävä

Oppimis-opetusaktiviteetit:

Ennen oppituntia: Osallistujia pyydetään lukemaan "Tutkimusyhteistyö (CoI) digitaalisessa pedagogiikassa" e-teach-hankkeen taustajulkaisusta (Knowledge paper) kappaleesta 2 tutustuakseen tämän moduulin sisältöön.

Oppitunnin aikana:

Videoluento (30 minuuttia): CoI aihe ja sen merkitys digitaaliselle pedagogiikalle esitellään sekä perusperiaatteet digitaalisessa pedagogiikassa selitetään. Esimerkkejä digitaalisista pedagogiikka-aktiviteeteista, jotka sisältävät CoI:a, esitellään. Oppimisalustalla, jossa luento esitetään, on myös resursseja CoI:n syvällisempään tutkimiseen (videoita, kuvia ja linkkejä verkkosivustoille).

Keskustelufoorumi (30 minuuttia): Osallistujia pyydetään keskustelemaan siitä, miten he voivat soveltaa CoI:a omaan opetuskäytäntöönsä. Erityinen painotus on kannustaa osallistujia jakamaan ideoita ja strategioita.

Osallistujia pyydetään laatimaan suunnitelma CoI:n sisällyttämiseksi omaan opetukseen.

Arviointityökalut:

Oppilaiden vastauksia ja vuorovaikutusta oppimisalustan keskustelufoorumilla arvioidaan oppimisalustalla perustuen ensimmäisten kahden oppimistavoitteen saavutuksiin (1. Ymmärrä CoI:in periaatteet digitaalisessa pedagogiikassa; 2. Tunnista opetusmuotoiluperiaatteet, jotka tukevat CoI:a digitaalisessa pedagogiikassa).

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Käytännön tehtävä antaa palautetta opettajille päätettäessä, kuinka hyvin osallistujat saavuttivat kolmannen tavoitteen (3. Laadi suunnitelma CoI:n sisällyttämiseksi omaan opetukseen).

Teoreettinen tausta (englanniksi)

Community of Inquiry (CoI)

To provide a meaningful and collaborative learning experience in an online and blended learning environment, the Community of Inquiry (CoI) model (Garrison et al., 2000) provides a framework that enables teachers to create a learning environment where the three elements of cognitive presence, social presence, and teaching presence are present.

Cognitive presence is the ability to construct meaning through sustained reflection and communication (Nolan-Grant, 2019). The CoI model acknowledges the importance of four phases in the development of cognitive presence: (1) triggering event, which defines the focus of further inquiry; (2) exploration of the issue; (3) integration, which enables learners to construct meaning from concepts formed in the previous phase; and (4) resolution, through the application of students' new skills and knowledge into real-world scenarios (Garrison et al., 2000). To facilitate the development of cognitive presence, online learning environments should provide students with opportunities to actively explore, investigate, and engage in online discussions. Teachers should also pose challenging questions and use breakout rooms during online lectures for student discussion. Finally, teachers should provide constructive feedback and effective assessment to help students apply their new skills and knowledge.

Social presence is the degree to which students are able to share their ideas, emotions and experiences, connect with others, and feel part of a community (Fiock, 2020). It includes emotional (affective) expression, open communication and group cohesion (Garrison et al., 2000). To promote social presence, teachers can use ice-breaker activities such as personal introductions, informal peer or group discussions, and digital storytelling. Moreover, they should use humanization strategies to bridge the distance between learner and teacher. Other activities that enhance social presence include providing students with the opportunity to create personal profiles, engaging students in online discussions, using small groups to promote collaboration and communication between students and the teacher, and using synchronous break-out rooms to facilitate one-on-one and small-group teaching.

Teaching presence is the design, facilitation and direction of cognitive and social processes to realise personally meaningful and educationally worthwhile learning outcomes (Garrison et al., 2000). It is composed of three factors: (1) design and organization, (2) facilitation and (3) direct instruction (Garrison et al., 2000). To promote teaching presence, teachers should set class norms, rules and expectations so that students can collectively conform to them. They should also plan and regularly inform

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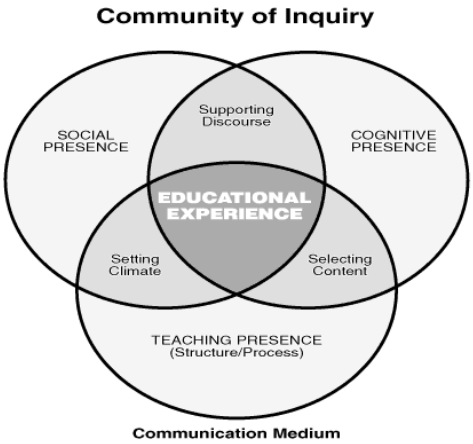
their students about instructional activities and goals. Furthermore, they should facilitate written or oral communication in their courses by presenting the content in different and interactive ways, by using technology tools to engage students in discourse, and by providing timely and regular feedback.

The CoI model provides teachers with a framework for creating a meaningful and collaborative learning experience in online and blended learning environments. By using the strategies outlined here, teachers can ensure that students have access to cognitive, social, and teaching presence.



Community of Inquiry framework (CoI) (Garrison et al., 2000).

Elements	Categories	Indicators (examples)
Cognitive Presence	Triggering events	Sense of puzzlement
	Exploration	Information exchange
	Integration	Connecting ideas
	Resolution	Apply new ideas
Social Presence	Emotional expression	Emotions
	Open communication	Risk-free expression
	Group cohesion	Encouraging collaboration
Teaching Presence	Instructional management	Defining and initiating discussion topics
	Building understanding	Sharing personal meaning
	Direct instruction	Focusing discussion

Elements, Categories and Indicators of CO Framework

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2.6. Moduuli 2 Oppitunti 6

Aihe: Universaali suunnittelu oppimiselle (Universal Design for Learning, UDL) -viitekehys digitaalisessa pedagogiikassa

Kesto: noin 1 tuni (asynkroninen)

Oppimistavoitteet: Tunnin lopussa osallistujat pystyvät:

1.Ymmärtämään Universal Design for Learning (UDL) -kehyksen periaatteet digitaalisessa pedagogiikassa.

2.Tunnistamaan opetusmuotoiluperiaatteet, jotka tukevat Universal Design for Learning (UDL) -kehystä digitaalisessa pedagogiikassa.

3.Laatimaan suunnitelman UDL:n sisällyttämiseksi omaan opetukseen.

Opetusmenetelmät/-tekniikat:

(1) Luentovideoiden esittely (nauhoitettu)

(2) Interaktiivinen materiaali (videot, kuvat ja verkkosivustot) oppimisalustan sivulla

(3) Ryhmäkeskustelu (foorumi)

(4) Käytännön tehtävä

Oppimis-opetusaktiviteetit:

Ennen oppituntia: Osallistujia kutsutaan lukemaan "Universal Design for Learning (UDL) -kehys digitaalisessa pedagogiikassa" eteach hankkeen taustajulkaisun (Knowledge paper) kappaleesta 2 tutustuakseen tämän moduulin sisältöön.

Oppitunnin aikana:

Videoluento (30 minuuttia): Universal Design for Learning (UDL) -kehys digitaalisessa pedagogiikassa ja sen merkitys digitaaliselle pedagogiikalle esitellään. UDL:n perusperiaatteet selitetään. Esimerkkejä digitaalisista pedagogiikkaaktiviteeteista, jotka sisältävät UDL:a, esitellään. Oppimisalustalla, jossa luento esitetään, on myös resursseja UDL:n syvällisempään tutkimiseen (videoita, kuvia ja linkkejä verkkosivustoille).

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Keskustelufoorumi (30 minuuttia): Osallistujia pyydetään keskustelemaan siitä, miten he voivat soveltaa UDL:a omaan opetuskäytäntöönsä. Erityinen painotus on kannustaa osallistujia jakamaan ideoita ja strategioita.

Osallistujia pyydetään laatimaan suunnitelma UDL:n sisällyttämiseksi omaan opetukseen.

Arviointityökalut:

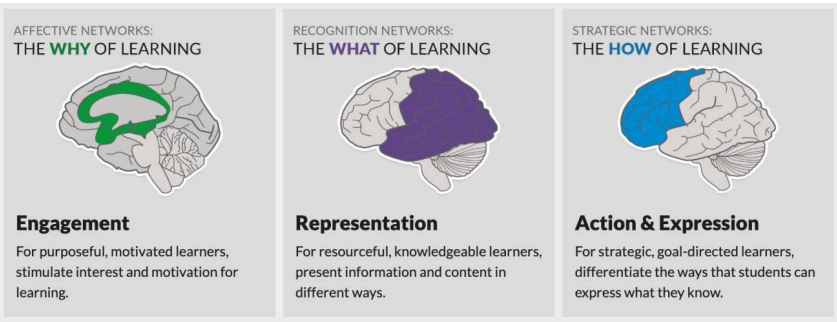
(1) Oppilaiden vastauksia ja vuorovaikutusta oppimisalustan keskustelufoorumilla arvioidaan perustuen ensimmäisten kahden oppimistavoitteen saavutuksiin (1. Ymmärrä Universal Design for Learning (UDL) -kehys; 2. Tunnista opetusmuotoiluperiaatteet, jotka tukevat Universal Design for Learning (UDL) -kehystä digitaalisessa pedagogiikassa).

(2) Käytännön tehtävä antaa palautetta opettajille päätettäessä, kuinka hyvin osallistujat saavuttivat kolmannen tavoitteen (3. Laadi suunnitelma UDL:n sisällyttämiseksi omaan opetukseen).

Teoreettinen tausta (englanniksi)

What is Universal Design for Learning (UDL) Framework?

Universal Design for Learning (UDL) is an educational framework that focuses on creating flexible and inclusive learning environments that meet the diverse needs of all learners. The goal of UDL is to remove barriers to learning and provide equal opportunities for all learners to succeed. UDL is based on the idea that instructional materials and activities should be designed from the start to accommodate the needs of all learners, including those with disabilities. The UDL Framework The UDL framework is composed of three main principles: multiple means of representation, multiple means of action and expression, and multiple means of engagement. These principles serve as guidelines for designing instructional materials and activities that are flexible, accessible, and inclusive.



Universal Design for Learning Guidelines (CAST, 2018).

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Multiple Means of Representation: This principle suggests that instructional materials should provide multiple ways to present information, such as text, images, audio, and video. This allows learners to access information in a way that works best for them, based on their individual learning style and needs.

Multiple Means of Action and Expression: This principle suggests that instructional materials should provide multiple ways for learners to interact with and express their understanding of the information. For example, this might include opportunities for learners to answer questions in writing, verbally, or through visual representation.

Multiple Means of Engagement: This principle suggests that instructional materials should provide multiple ways for learners to engage with the content and each other. This might include opportunities for collaboration, discussion, or hands-on activities.

How to Implement UDL in an Online/Blended Course?

1. Start with the learning objectives: When designing instructional materials and activities, start by considering the learning objectives you want to achieve. This will help you identify what information needs to be included and what types of activities will be most effective for your learners.
2. Incorporate multiple means of representation: Use a variety of media and formats to present information, such as text, images, audio, and video. Provide closed captioning and audio descriptions for videos. Offer alternatives such as audio or braille versions of written materials.
3. Provide multiple means of interaction and expression: Offer opportunities for learners to interact with the content and express their understanding in multiple ways. This might include written, oral, or visual responses. Offer different ways to demonstrate understanding, such as through written essays, presentations, or interactive activities.
4. Encourage multiple means of engagement: Provide opportunities for learners to engage with the content and each other in a variety of ways. This might include discussion forums, collaborative projects, or hands-on activities.
5. Continuously evaluate and refine your materials: Regularly evaluate the effectiveness of your instructional materials and activities. Make adjustments as needed to ensure that they are flexible, accessible, and inclusive for all learners.

In conclusion, the Universal Design for Learning (UDL) framework provides a useful set of guidelines for creating flexible and inclusive learning environments that meet the diverse needs of all learners. By incorporating the three principles of UDL into an course, teachers can provide a positive and effective learning experience for all students.

For more information and material, please visit the official website of the UDL Guidelines: https://udlguidelines.cast.org/

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MODUULI 3: DIGITAALINEN SISÄLLÖNTUOTANTO

Marian Cristescu, Lucian Blaga University of Sibiu

SISÄLTÖ

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3.1. Moduuli 3 Oppitunti 3

Aihe: Digitaalisen sisällön tuottaminen

Kesto: 2 tuntia (120 minuuttia)

Oppimistavoitteet: Tunnin lopussa osallistujat:

(1) Ymmärtävät digitaalisen sisällön tuottamisen käsitteen

(2) Pystyvät jäsentämään digitaalisen oppisisällön tuottamisprosessin eron verrattuna perinteiseen;

(3) Osaavat selittää digitaalisen sisällön tuottamisen prosessin merkityksen monimuoto- ja etäopetuksessa;

(4) Osaavat kertoa esimerkkejä digitaalisen sisällön tuottamisesta ja käytöstä luokkahuoneessa sekä monimuoto- ja etäkursseissa.

Opetusmenetelmät/-tekniikat:

(1) Yksilötyö;

(2) Pyöreän pöydän keskustelu;

(3) Tapausanalyysi;

(4) Kysymys-vastaus (K&V).

Oppimis-opetusaktiviteetit:

(1) Ennen oppituntia: opiskelijat tutkivat suositeltuja kirjallisia materiaaleja, jotka tarjoavat heille perustiedot digitaalisen sisällön luomisen ja kehittämisen menetelmistä ja tekniikoista. Lisäksi he tutustuvat verkkoresursseihin saadakseen yksityiskohtaisen kuvan alasta. Opettaja suosittelee oppijoille luettavaksi teoksen "Building Digital Content for E-Learning. Information and Communication Technologies (ICT) Competence" (https://www.researchgate.net/publication/275951612_Building_Digital_Content_for_ELearning_Information_and_Communication_Technologies_ICT_Competence).

(2) Oppitunnin aikana:

a) Kurssin alussa opiskelijat jaetaan kahden, neljän tai kuuden hengen ryhmiin;

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b) ryhmissä opiskelijat käyvät keskusteluja aiheista, kuten digitaalisen sisällön luomisen periaatteet, sen ominaisuudet ja digitaalisen sisällön peruskomponentit. Lisäksi he keskustelevat digitaalisen sisällön tuottamisen ja perinteisen sisällön luomisen prosesseista. Arvioitu kesto tälle osuudelle on 10 minuuttia;

c) Opiskelijat keskustelevat myös suorasta yhteydestä digitaalisen sisällön luomisen/kehittämisen menettelytapojen ja modernien monimuoto- ja etäopetuksen muotojen välillä. Ajatusten kirjaamiseksi he käyttävät ryhmäkeskustelua varten valmisteltuja muistiinpanoalustoja ja lisäävät niihin keskusteluista johtuvat johtopäätökset. Tämä osuus kestää noin 10 minuuttia;

d) Opettaja seuraa tarkasti ryhmäkeskusteluja, vastaa opiskelijoiden kysymyksiin ja antaa tarvittavaa palautetta. Tämä osuus kestää arviolta 10 minuuttia;

e) Ryhmäkeskustelujen aikana tulevat opettajat vaihtavat ajatuksia sekä oman ryhmänsä kesken, että koko luokan kanssa. Tämä osuus kestää noin 5 minuuttia;

f) Ryhmäkeskustelujen ja tulevien opettajien antamien vastausten ja palautteen avulla opettaja tekee yhteenvedon digitaalisen sisällön luomis-/kehittämisprosessin olennaisista näkökohdista ja siitä, miten ne voidaan toteuttaa luokkahuoneessa. Tämä osuus kestää noin 15 minuuttia;

g) Tämän jälkeen opiskelijat palaavat aiemmin luotuihin ryhmiin. Ryhmät suunnittelevat ja yksityiskohtaistavat oppitunnin, jonka tarkoituksena on perehdyttää oppilaat/opiskelijat digitaalisen sisällön luomisen/kehittämisen menetelmiin ja tekniikoihin sekä sen käyttöön tunneilla. Tämä osuus kestää noin 20 minuuttia;

h) Jokaisessa ryhmässä luodaan oppituntisuunnitelma/kaavio. Tämän osuuden kesto on noin 5 minuuttia;

i) Opettaja seuraa etenemistä ja antaa palautetta tarvittaessa;

j) Seuraavaksi suunnitelmat jaetaan koko ryhmän kanssa. Oppijat/opiskelijat kertovat kokemuksistaan tehtävän teosta. Tämä osuus kestää noin 30 minuuttia;

k) Oppijoiden/opiskelijoiden suunnitelmat julkaistaan verkossa, jotta niihin voivat tutustua kaikki kiinnostuneet;

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l) Loppuosuudessa opiskelijat kirjoittavat pohdintapaperin digitaalisen sisällön tuottamisen ja sen käytön prosesseista ja niiden merkityksestä verkkopedagogisissa toiminnoissa. Loppuosuuden kesto on noin 15 minuuttia.

Arviointityökalut:

(1) Vertaisarviointi on tarpeellinen ryhmien opiskelun arvioimiseksi;

(2) Itsearviointi on tarpeen oman edistymisen yksilöllisen arvioimiseksi;

(3) Esseen kirjoittaminen on olennaista ryhmäprosessien ymmärtämiseksi;

(4) Rubriikin arviointia käytetään suunniteltujen toimintojen arvioimiseen.

Teoreettinen tausta (englanniksi)

In the context of the knowledge-based economy and society, which are undergoing rapid change, it is becoming increasingly relevant to capitalize on the potential of digital technologies in order to innovate educational practices, facilitate access to lifelong learning, respond to the rapid expansion of new skills, especially those digital, necessary to maintain and/or improve the current standard of living of individuals, their fulfillment on a personal and professional level, a good state of health, maintaining competitiveness on the labor market, personal and professional development, professional insertion, social inclusion, citizenship active and responsible, etc.

Modern society is becoming more mobile and digital every day. In it, more and more jobs become automated, professional and interpersonal communication is transferred, mostly to the online environment, and digital technologies play a crucial role in all areas of human activity. In these conditions, skills such as effective interpersonal and/or intercultural communication, use of information and communication technologies (ICT) for professional and personal purposes, cooperation and collaboration, critical thinking, rapid problem solving, creativity, self-regulation, computational thinking, etc. are increasingly essential.

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Along with the explosion and rapid expansion of digital technologies, the Internet and social networks in all areas of personal and professional activity of the individual, the style of communication has also changed considerably. This also reflects the topicality of the topic addressed, as young generations are born surfing the growing digital wave and are raised and educated in an overwhelmingly evolving digital world. They adapt very easily to the digital dynamics and master all digital devices right from their childhood.

In these conditions, when a large part of communication is transferred from the traditional environment to the online one, it is appropriate to talk about the training and development of children and young people not only of traditional communication skills, in their mother tongue or any foreign language, but also digital communication competence. Well-developed digital communication skills revolutionize and considerably change the rules of traditional communication – both interpersonal and professional.

The need to develop digital communication skills in pupils/students is reflected by the requirements and demands of national and international educational policies (Recommendation of the European parliament and of the council of 18 December 2006 on key competencies for lifelong learning (EUPA, 2006), Recommendation of the council of 22 May 2018 on Key Competences for Lifelong Learning (EUCO, 2018: pp. 7-8), European Framework of Reference for Key Competences for Lifelong Learning (EUCA, 2006), Common European Framework of Reference for Languages: Learning, Teaching, evaluation (EUCA, 2003: p. 18), Digital competence framework for citizens: DigComp 2.1 (CARR, 2017), European framework for digital competence of teachers DigCompEdu (REDE, 2017), Education Code of the Republic of Moldova (EDCO, 2014), Education development strategy for the years 2014-2020 "Education-2020" (GOVE, 2014: p. 36), National Strategy for the development the information society "Digital Moldova 2020" (GOVE, 2018), National Qualifications Framework or in the Higher Education of the Republic of Moldova (UNIV, 2015), the Reference Framework of the National Curriculum (GUȚU, 2017: p. 17) and the Digital Competence Standards of General Education Teachers (GREM, 2015).

Lähteet

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3.2. Moduuli 3 Oppitunti 2

Aihe: Digitaalisen sisällön vaikutus digitaaliseen opetusprosessiin

Kesto: 1 tunti (60 minuuttia)

Oppimistavoitteet: Tunnin lopussa osallistujat:

(1) osaavat esitellä ne menetelmät ja tekniikat, joilla digitaalisesta opetuksesta voi tulla koko opetusprosessin kehys;

(2) osaavat selittää, miten digitaalinen sisältö rakennetaan/kehitetään sosiaalisessa ympäristössä ja miten se vaikuttaa perinteiseen luokkatilassa tapahtuvaan opetusprosessiin;

(3) osaavat kuvailla digitaalisen opetuksen perusominaisuudet perinteisessä luokkahuoneessa.

Opetusmenetelmät/-tekniikat:

(1) Ryhmäkeskustelu,

(2) Parityöskentely,

(3) Kysymyksiä ja vastauksia osallistujien kesken,

(4) Kysymyksiä ja vastauksia ohjaajan ja osallistujien kesken,

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(5) Keskustelu,

(6) Yhteisöllinen oppiminen.

Learning-Teaching Activities:

(1) Ennen oppituntia: Oppijat/opiskelijat perehtyvät ensin perustietoihin digitaalisesta opetuksesta, joka tapahtuu perinteisessä luokkahuoneessa. Lisäksi oppijoita/opiskelijoita kannustetaan käyttämään online-tietokantoja ja muita kirjallisia lähteitä ja viimeisimpiä julkaisuja, joissa esitetään digitaaliseen opetukseen liittyvää tutkimustoimintaa ja kuinka se vaikuttaa perinteiseen opetusprosessiin yhteiskunnassa. Oppijat/opiskelijat saavat ohjeita opettajalta siitä, miten löytää ensisijaisia ja toissijaisia kirjallisia resursseja verkosta.

(2) Oppitunnin aikana:

a) Opettaja/ohjaaja aloittaa oppitunnin osuudella, jossa hän määrittelee aiheen olennaiset käsitteet: digitaalinen opetus, digitaalisen sisällön rakentaminen/kehittäminen, perinteinen luokkahuone vs. verkkoluokka sekä oppimis/arviointi/tiedonhankintaprosessi. Tämä osuus kestää noin 10 minuuttia;

b) oppijat/opiskelijat jaetaan ryhmiin ja kannustetaan keskustelemaan ja kirjaamaan aikaisemmin mainittujen termien määritelmät. Tämä osuus kestää noin 15 minuuttia;

c) Tämän jälkeen oppijat/opiskelijat keskustelevat määritelmistä opettajan ohjatessa heitä ja selventäessään käsitteitä. Osuus kestää noin 20 minuuttia;

d) Opettaja/ohjaaja tiivistää keskustelut määritelmistä ja esittelee perinteisen luokkahuoneen peruspiirteet sen jälkeen kun on käytetty digitaaliseen opetukseen liittyviä menetelmiä ja tekniikoita, kiinnittäen erityistä huomiota siihen, miten digitaalinen tieto on läsnä tässä prosessissa. Lisäksi hän korostaa, miten digitaalinen opetus osallistuu tiedonvälitysprosessiin. Tämä osuus kestää noin 15 minuuttia.

(3) Oppitunnin jälkeen: Oppijoiden/opiskelijoiden tulee kirjoittaa essee, jossa he hahmottavat, millainen perinteinen luokkahuone voi olla, kun siihen integroidaan digitaalisen opetuksen välineitä, ja miten opiskelijat käyttävät digitaalista sisältöä oppimisprosessissa.

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Arviointityökalut:

(1) Kysymys-vastaus (K&V): Tämän oppitunnin ensisijainen arviointityökalu on oppijoiden/opiskelijoiden sekä ohjaajan ja osallistujien välinen kysymys-vastaus -menetelmä.

(2) Essee: Essee tehtävänä tarjoaa palautetta opettajalle päätöksenteon tueksi siitä, miten osallistujat saavuttavat oppitunnin alussa luetellut tavoitteet.

Teoreettinen tausta (englanniksi)

The term digital education can be difficult to define in just a few words. In his introduction to the MLA Digital Pedagogy Unconference, Brian Croxall (Croxall, 2012) provides a broad definition of digital education, stating that: "Digital education is the use of electronic elements to enhance or change the experience of education.". Digital education is not only about using technologies for teaching, but rather about approaching these tools from a critical pedagogical perspective. So it is important to use digital tools carefully, but it is even more important to decide when not to use them, and especially how much attention you pay to the impact of digital tools on learning.

Below is a brief description of digital education:

- teaching/learning/assessment method that uses modern technological means;
- the student who benefits from online learning can carry out his activity wherever there is an internet connection;
- the physical presence of the teacher in the classroom is not necessary;
- can be achieved through appropriate digital means, selected by the teacher through communication networks, digital resources and learning platforms.

In the book Design for how people learn, Julie Dirksen (Dirksen, 2015) recalls the response she always gets when invites adults to reminisce about a learning experience. That answer is I always had a great teacher. That suggests that a significant part of what makes a great learning experience isn't about the content, but it's about how the content is taught. In fact, a class can teach the same subject but be very different, depending on how the subject is taught.

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Learning can be taken beyond the subject, even beyond the classroom, if we take into account the learning principles of the brain.

The human brain needs stimulation and connection to survive, but above all to develop.

With these aspects in mind, any learning context, regardless of age, can be adapted to the following stages of learning process:

1. **Connecting with the subject**:

- This first stage is the WHY of learning the subject you are going to teach - you create an experience that produces an emotional connection with the subject;
- It is closely related to remembering similar/familiar things that you have experienced under similar conditions;
- It's an automatic process that the brain does, it seeks, first of all, what it knows.

2. **Integration of new knowledge**:

- After the connection experience, the rational, cognitive connection with the subject occurs. Children begin to think about the first experience, create connections with what they already know;
- The brain prefers pictures of words. Olimpia Meșa in her book "How People Learn" (Meșa, 2020), suggests we help the brain to capture information more easily through images, through drawing. After hearing a story or new concept, have the child draw it in as much detail as possible. That way he retains it more easily, having the big picture in front of him.

3. **Exercise**:

- You create contexts of practice and real action for children, to apply what they have learned, give a form to the abstract. They evaluate their work and have autonomy over the process.

4. **Practice in new contexts**:

- Apply in the real world what they have learned, create habits and patterns;
- At the moment when a new neural connection was created, the child knows how to access that information instantly, knows what to use it for when he encounters a familiar situation in real life. Even if it is only a portion of what he knows, he can

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create something new. The brain manages to see the big picture and put the information in exactly the right place;

- It is the stage where habits and routines are formed.

The learning principles of the brain can be applied regardless of the learning context - whether it occurs in the digital environment or in the physical environment and regardless of the age of the learner.

Lähteet

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3.3. Moduuli 3 Oppitunti 3

Aihe: Avointen oppimateriaalien ja digitaalisen opetussisällön edistäminen

Kesto: 1 tunti (60 minuuttia)

Oppimistavoitteet: Tunnin lopussa osallistujat:

(1) osaavat kuvata avoimen opetuksen käsitteen merkitystä ja tärkeyttä nykypäivän tietopohjaisessa yhteiskunnassa;

(2) osaavat keskustella siitä, mitä digitaaliset opetusresurssit ovat ja millainen rooli niillä on nykyajan monimuotoisessa oppimisessa;

(3) osaavat luetella joitain digitaalisen sisällön käytön etuja ja haittoja avoimessa opetuksessa, perinteisten keinojen ja menetelmien perusteella tapahtuvan opetuksen ollessa vertailukohtana;

(4) osaavat esitellä pääasialliset menetelmät ja tekniikat perinteisten opetusresurssien muuttamiseksi digitaalisiksi resursseiksi.

Opetusmenetelmät/-tekniikat:

(1) Ryhmäkeskustelu,

(2) Parityöskentely,

(3) Kysymyksiä ja vastauksia osallistujien kesken,

(4) Kysymyksiä ja vastauksia ohjaajan ja oppijoiden/opiskelijoiden kesken.

Oppimis-opetusaktiviteetit:

(1) Ennen oppituntia: oppijat/opiskelijat jaetaan virtuaalisessa luokkahuoneessa ryhmiin ja he käyvät ensin läpi avoimen opetuksen käsitteitä ja sitä, miten digitaalinen sisältö vaikuttaa siihen käyttäen apunaan alla olevaa teoriatekstiä. Lisäksi opettaja suosittelee heitä etsimään kansainvälisistä tietokannoista viimeaikaisia julkaisuja digitaalisten opetusresurssien ja avoimen opetuksen alalta (enintään 5-7 vuotta vanhat julkaisut). Opettaja ohjaa oppijoita/opiskelijoita jakamaan tietonsa ryhmänsä sisällä ja koko luokan kanssa.

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(2) Oppitunnin aikana:

a) Oppitunnin alkuosassa opettaja/ohjaaja määrittelee aiheen käsitteet: avoimen oppimateriaalin ominaisuudet, avoin opetus ja digitaalisen sisällön edistämisen menetelmät avoimessa opetuksessa. Tämä osuus kestää noin 10 minuuttia;

b) Oppijat/opiskelijat jaetaan kolmen hengen ryhmiin ja heitä pyydetään keskustelemaan, kehittämään ja kirjaamaan kyseisten termien määritelmiä tulevaa keskustelua varten. Tämä osuus kestää noin 15 minuuttia;

c) Tämän jälkeen oppijat/opiskelijat osallistuvat luokkakeskusteluun (aivoriihi) jatkaakseen määritelmien tarkastelua. Tämä sisältää lisää keskustelua vaikeasti ymmärrettävistä käsitteistä, oppijoiden/opiskelijoiden kysymys-vastaus -osuuden ja lisää ohjausta ja neuvontaa opettajalta/ohjaajalta. Osuus kestää noin 20 minuuttia;

d) Oppitunnin päätteeksi keskustellaan käsitellyistä määritelmistä ja tunnistetaan peruselementit perinteisestä luokkahuoneesta, kiinnittäen erityistä huomiota siihen, miten opettaja voi ylläpitää digitaalista sisältöä. Lisäksi avataan digitaalisten opetusresurssien luomisen/kehittämisen menetelmiä ja tekniikoita. Osuus kestää noin 15 minuuttia.

(3) Oppitunnin jälkeen: Oppijat/opiskelijat kirjoittavat esseen, joka ilmentää miten he ymmärtävät avoimen opetuksen ja digitaalisten opetusresurssien edistämisen menetelmiä ja tekniikoita, ja miten oppijat/opiskelijat reagoivat siihen virtuaalisessa luokkahuoneessa.

Arviointityökalut:

(1) Kysymys-vastaus (K&V): Tämän oppitunnin ensisijainen arviointityökalu on kysymykset ja vastaukset oppijoiden/opiskelijoiden kesken sekä myös opettajan/ohjaajan ja osallistujien kesken.
(2) Essee: Essee-tehtävä tarjoaa joitain palautteita opettajalle/ohjaajalle päätöksenteon tueksi siitä, kuinka hyvin osallistujat saavuttavat oppitunnin alussa luetellut tavoitteet.

Teoreettinen tausta (englanniksi)

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The dynamics of the changes taking place in the world constitute a challenge for all actors of the educational system. The acceptance and promotion of the postmodern paradigm, based on humanism and constructivism, the approach to education from the perspective of the learner and the development of the educational process from the perspective of competence-based pedagogy are just some of the new imperatives. All these realities require a resizing of the educational process and resources, but also of the goals. The training systems must contribute to satisfying the increasingly urgent need for continuous updating of knowledge and skills in the conditions of an increasingly extensive international labor market, aiming, at the same time, for greater efficiency and equity.

In this context, the widespread use, including in the educational system, of information technologies and resources, but also the facilitation, through them, of access and information exchange. Electronic resources, digital contents and virtual educational spaces offer the latest, most diverse information and opportunities for continuing education. In recent years, the aspects directly related to open data/digital educational resources are widely addressed by the international educational community. Most of the European states, and not only them, have undertaken commitments related to the opening of public data and the renunciation of intellectual property rights, precisely to encourage the creation of new services and products based on existing data. This initiative, called the Open Government Partnership (www.opengovpartnership.org), was launched in 2011 by the USA (OGP, 2011). And at the European level, a series of actions related to the promotion of digital educational content were carried out, with the aim of improving the quality and access to education, the European Commission developing a series of public policy documents that encourage the reuse of information in innovative ways and designing educational materials under open licenses.

David Wiley, (Wiley, 2021) one of the promoters of these ideas, emphasizes the need for open education, which also includes an open pedagogy with certain key components, including digital educational resources (DER).

Digital educational resources, according to Wikiversity (WIKI, 2002), refer to unimpeded access to instructional materials, facilitated by information and communication technologies, for consultation, use and adaptation by users for non-commercial

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purposes. The term was adopted at the UNESCO Forum in Paris (UNES, 2002), during which the impact of Open Courseware projects on higher education was analyzed. Based on the same source, we mention that DER include:

a) teaching-learning materials: open projects (open courseware and open content), free courses, directories of learning objects (learning objects), educational journals;
b) open source software – for development, use, reuse, search, organization and access to resources; virtual learning environments (LMS – Learning Management Systems), learning communities;
c) intellectual property licenses that promote the open publication of materials, design principles and best practices, localization of content.

So, in addition to the actual materials, the concept of digital educational resources can also include specialized tools such as the software necessary for the development, use and delivery of digital educational materials, including that intended for searching and organizing content, as well as virtual learning and training communities. According to Grosseck and Holotescu (Gros, 2020), DER constitutes the first "common good" (that is, the "commons" that Creative Commons licenses want to develop), to which teachers, pupils, students and the sphere academic should have access. The benefits will be important for everyone: students - the primary source of digital content, teaching staff, the educational institution, representatives of other sectors.

Lähteet

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3.4. Moduuli 3 Oppitunti 4

Aihe: Opetuksen digitaalisten resurssien suunnittelu ja luominen

Kesto: 2 tuntia (120 minuuttia)

Oppimistavoitteet: Tunnin lopussa osallistujat:

(1) Osaavat selittää, mitä digitaaliset oppimisresurssit tarkoittavat ja mikä ovat niiden tärkeimmät erot perinteisiin (klassisiin) oppimisresursseihin verrattuna ja miten niitä voidaan käyttää perinteisessä luokkahuoneessa;

(2) Osaavat antaa esimerkkejä digitaalisten resurssien suunnitteluelementeistä eri oppimiskonteksteissa;

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(3) Osaavat esitellä pääasialliset menetelmät ja tekniikat digitaalisten resurssien suunnitteluun, integrointiin ja arviointiin monimuoto-opetuksessa ja kuvata digisisällön tuomat olennaiset muutokset opetusprosessiin.

Opetusmenetelmät/-tekniikat:

(1) Ryhmäkeskustelu,

(2) Parityöskentely,

(3) Kysymyksiä ja vastauksia osallistujien kesken,

(4) Kysymyksiä ja vastauksia ohjaajan ja osallistujien kesken.

Oppimis-opetusaktiviteetit:

(1) Ennen oppituntia: Oppijat lukevat ensin taustatietoja digitaalisista resurssityypeistä, digitaalisten oppimismateriaalien suunnittelusta, suunnitteluympäristöistä ja saavutettavuudesta. Lisäksi heitä kehotetaan etsimään ja lukemaan verkossa saatavilla olevia relevantteja tutkimuksia, jotka esittelevät mobiilioppimisen pääpiirteitä sekä m-oppimisen koulutukseen liittyviä resursseja ja aktiviteetteja. Opettaja tarjoaa tämän tiedon myöhemmin kuvattavassa teoreettisen tiedon osiossa. Oppijat/opiskelijat pyydetään myös tallentamaan ja jakamaan muiden kanssa yksilölliset kokemuksensa digitaalisten resurssien luomisesta ja käytöstä formatiivisessa, summatiivisessa arvioinnissa ja palautteessa.

(2) Oppitunnin aikana:

a) Opettaja aloittaa määrittelemällä peruskäsitteet päivän aiheeseen liittyen: "digitaalisten resurssien tyypit", "digitaalisten resurssien suunnittelun elementit", "digitaalisten resurssien suunnitteluympäristöt" ja "virtuaaliympäristöt". Osio kestää noin 15 minuuttia;

b) Jaettuaan oppijat/opiskelijat ryhmiin heitä kutsutaan keskustelemaan ja kirjaamaan yllä mainittujen termien määritelmiä. Tämän osion kesto on noin 20 minuuttia;

c) Opettaja pyytää oppijoita/opiskelijoita jakamaan käsityksensä siitä, miten heidän oppilaitoksensa ovat omaksuneet digitaalisten resurssien suunnittelun, integroinnin ja arvioinnin menetelmiä, joita käytetään verkko- ja/tai monimuoto-oppimisessa. Opettaja

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keskittyy menetelmiin ja tekniikoihin digitaalisten resurssien luomiseksi ja käyttämiseksi formatiivisessa, summatiivisessa arvioinnissa ja palautteessa. Tämä osio kestää noin 20 minuuttia;

d) Opettaja seuraa edelleen, millaisia henkilökohtaisia kokemuksia oppijat/opiskelijat ovat saaneet liittyen sopivimpien pedagogisten mallien käyttöön digitaalisten resurssien valinnassa (TPACK, SAMR, PIC-RAT jne.). Jokaiselle osallistujien ilmaisemalle mallille opettaja tarjoaa lisää esimerkkejä tarpeen mukaan. Tämä osio kestää noin 15 minuuttia;

e) Opettaja esittelee osallistujille olennaista tietoa dokumentointiprosessista, hakustrategioista, laadun arviointikriteereistä ja digitaalisten resurssien tallentamisesta. Tämä osio kestää noin 15 minuuttia;

f) Oppijat/opiskelijat osallistuvat määritelmien jatkotyöstämisen koko luokan yhteisessä keskustelussa. Yhdessä keskustellaan myös digitaalisten resurssien käytöstä opetusprosessissa. Tämä osio kestää noin 15 minuuttia.

(3) Opettaja käy läpi keskusteluista saadut johtopäätökset yllä mainittujen termien määritelmistä ja luettelee menetelmien ja tekniikoiden peruspiirteet digitaalisten resurssien suunnittelulle, integroinnille ja arvioinnille, jotka voidaan ottaa käyttöön verkko- ja monimuoto-opetuksessa, kiinnittäen erityistä huomiota siihen, miten digitaaliset resurssit luodaan ja niitä käytetään formatiivisessa, summatiivisessa arvioinnissa ja palautteessa. Lisäksi huomiota kiinnitetään myös resurssien sopeuttamisprosessiin verkko- ja monimuoto-opetuksen kannalta, sekä vastaavasti resurssien luomiseen/kehittämiseen synkronisten ja asynkronisten aktiviteettien osalta. Tämä osio kestää noin 20 minuuttia.

(4) Oppitunnin jälkeen: Oppijat/opiskelijat laativat esseen opitun pohjalta, jossa heitä pyydetään selittämään, miten he ymmärtävät prosesseja kuten digitaalisten oppimisresurssien suunnittelu ja valmistaminen, digitaalisten resurssien suunnittelun elementtien luokittelu eri oppimiskonteksteissa, digitaalisten resurssien suunnittelu, integrointi ja arviointi, jotka ovat käytössä verkko-oppimistoiminnoissa, sekä esittämään esimerkkejä, jotka ovat relevantteja verkko- ja monimuoto-oppimiselle.

Arviointityökalut:

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(1) Kysymys-vastaus (K&V): Tämän oppitunnin ensisijainen arviointityökalu on kysymykset ja vastaukset opiskelijoiden kesken sekä opettajan ja osallistujien välillä.
(2) Ristikkomuotoinen arviointi (rubriikkiarviointi) on käytössä suunniteltujen aktiviteettien arvioinnissa.
(3) Essee: Essee-tehtävä tarjoaa palautetta opettajalle päätöksenteon tueksi siitä, kuinka hyvin osallistujat saavuttavat oppitunnin alussa luetellut tavoitteet.

Teoreettinen tausta (englanniksi)

In general, technology-assisted (digital) training resources target both the hardware component, the device itself, and the software applications installed on it. Thus, the teaching staff can use various means and devices (computer, mobile phones, smartphones, PDAs, mini notebooks, etc.), methods and resources based on digital technology such as virtual environments, learning management systems (LMS), educational software, online tools, digital learning materials, serious games, augmented and virtual reality applications, and other emerging technologies.
A virtual learning environment is a digital learning environment with two basic functions:
(1) interaction between teachers/tutors and students/learners, including communication and information exchange;
(2) content distribution, i.e., online publications, management and retrieval of documents and other information.
Perhaps better known is the learning management system (Learning Management System, LMS), which represents a software system that allows the organization of online education, by recording the training process, test results, going through all the educational material transmitted etc. (Dobre, 2010).
Digital tools can be categorized into educational software and online applications. Educational software refers to applications built for didactic purposes, aimed at achieving educational objectives based on theoretical contents, experimental/practical activities and skills targeted by school programs. Practical educational software combines the computer product with pedagogical design, being a digital alternative to traditional methods and means.

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Online applications refer to those tools in the cloud, independent of the curriculum content, which can be used punctually in a didactic activity designed by the teacher.

This type of applications began to be intensively integrated into learning activities from the moment when mobile technology, sensors, cloud computing became accessible on a large scale, combined with the desire of teachers to think about their own didactic activities supported by technology. A ranking of the most used online applications, both for the academic environment and in general, you can access on the website created by Jane Hart for the year 2020, (Hart, 2020), it can be accessed at https://www.toptools4learning.com/top-100s.

According to the Explanatory Dictionary of the Romanian Language (DEX), a resource is any "reserve or source of means (material or spiritual) likely to be exploited in a given circumstance". Some terminological clarifications are necessary to clarify this concept:

- Any resource, of any type, that is used in the didactic act is an educational resource (examples: textbooks, games, tests, presentations, lesson plans, subject sheets and other teaching-learning materials);
- If it is available on the web (so accessible via a link) we talk of an online resource;
- If it is available in a digital format (audio, pdf, video, software, etc.), but without needing an Internet connection to be accessed, we are talking about a digital resource;
- Any online resource is also digital, but the other is not valid.

A number of tools and applications can be used to access, use, create or share these resources. For example, to edit texts we use Microsoft Word, OpenOffice or LibreOffice, and to watch or share video clips we use YouTube or Vimeo; we use Canva, Microsoft PowerPoint or Prezi to create visual communication materials, etc.

The context in which we combine several digital resources individually (for example, a piece of text or a video), we will hereinafter refer to as aggregation. If it provides meaning and unity, we speak of a digital aggregation. The result is also a digital resource, which can be referred to and described unitarily (Gunesch, 2019).

The concept of Augmented Reality (AR) was first introduced by Azuma (Azuma, 1997), AR being characterized by the combination of real and virtual worlds, real-time interaction and accurate 3D registration of virtual and real objects. AR is not strictly linked to any

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type of device (computer, portable devices, etc.) or technology, the virtual component having the role of informationally enriching reality.

AR is a technology that overlays/projects virtual data over/into the real world, being especially beneficial for making connections between artifacts/educational materials obtained/used in learning experiences from the physical spatial universe as well as from various virtual environments (web, reality virtual 3D) (Höllerer & Feiner, 2004). Moreover, mixed reality not only overlays but also anchors virtual objects in the real world. In education, I can identify various possibilities of using AR, such as AR teaching materials, discovery learning using AR or games based on AR.

An appropriate way to assess whether a particular application/technology is being used in teaching activity to its maximum potential is by using the SAMR model developed by Dr. Ruben Puentedura (Puentedura, 2009). The SAMR model defines the different stages of technology integration (devices and applications) in the classroom, from Substitution, to Augmentation, to Modification and Redefining.

The TPACK framework is made up of seven areas of competence aimed at: the pedagogical content (Pedagogical Knowledge, PK), the content of the discipline taught (Content Knowledge, CK), the technologies used (Technological Knowledge, TK), and the intersections between them TPK, TCK, PCK and TPACK (figure 1), to which is added the context in which the technology-based activity takes place, given by the teacher's awareness of available technologies, knowledge of the school, national policies in education (Mishra, 2019).

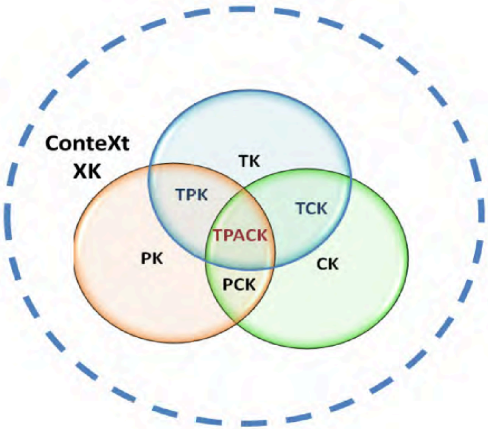

Figure 1. TPACK and knowledge of context (XK) (adapted from Mishra, 2019)

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For teachers to use the TPACK framework effectively, they should capitalize on the following ideas:

- Concepts (from the contents to be taught) can be represented using digital technology;
- The targeted disciplinary content can be approached in various ways using digital technology;
- Digital technology helps to approach different contents that require different skill levels of students;
- Activities based on digital technology should take into account students' previous experience in using it;
- Digital technology and knowledge of prior subject-specific notions and concepts used in tandem help students to consolidate learned concepts, acquired skills or acquire/develop new ones.

We start from the premise that evaluation is a dynamic process, an integral part of the online teaching activity. Also, assessment must favor self-reflection and self-regulation of learning, going beyond the traditional level of ranking, classifying students and checking knowledge. In the virtual classroom we can evaluate from multiple perspectives, but first of all we can:

- evaluate learning – summative assessment;
- assess to improve learning – formative assessment;
- evaluate as a way of learning - reflection on one's own learning.

As a result of the advancement of digital technology, assessment can be transformed to be authentic, accessible, properly automated, continuous and secure (JISC, 2020).

Returning to the online environment, the assessment involves specific methods and tools, some of which are presented in figure 2.

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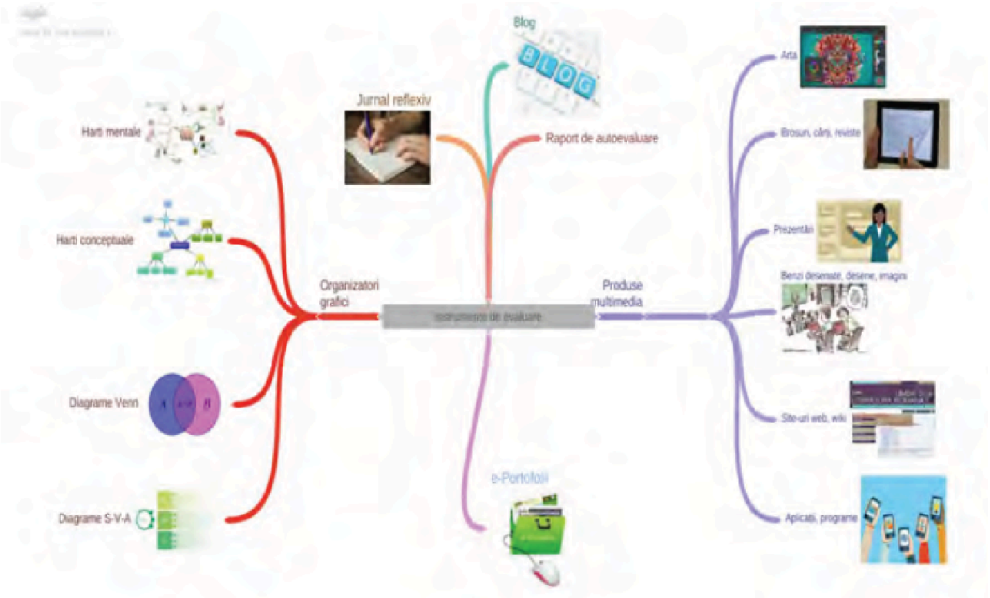

Figure 2. Assessment tools (made with the Coggle application)

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e-teach
Upskilling Digital Pedagogy

Moduuli 4
Digipedagogiikan integrointi opetukseen ja oppimiseen

UH

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MODUULI 4: DIGIPEDAGOGIIKAN INTEGROINTI OPETUKSEEN JA OPPIMISEEN

Jari Lavonen, Tiina Korhonen & Laura Salo, University of Helsinki

SISÄLTÖ

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4.1. Moduuli 4, Oppitunti 1

Aihe: Teknologis-pedagoginen sisältötieto (Digipedagogiikka)

Kesto: 2 tuntia (120 minuuttia)

Oppimistavoitteet: Tämän oppitunnin päätteeksi osallistujat:

(1) Ymmärtävät opettajien teknologis-pedagogisen sisältötiedon (TPACK) käsitteen ja osaavat käyttää digipedagogiikkaa suunnitellessaan, toteuttaessaan ja arvioidessaan opetusta.

(2) Tunnistavat eron TPACKin (digipedagogiikka) ja PCKn (perinteinen pedagogiikka) välillä.

(3) Osaavat selittää, miksi TPACKin (digipedagogiikka) käyttö on olennaista digitaalisessa ja etäopetuksessa.

(4) Osaavat tarjota esimerkkejä TPACKin (digipedagogiikka) käytöstä luokkahuoneessa.

Opetusmenetelmät/tekniikat:

(1) Itsenäinen työskentely

(2) Keskustelu

(3) Kysymys-vastaus (Q&A)

(4) Yhteisöllinen oppiminen

Oppimis-opetusaktiviteetit:

(1) Ennen oppituntia: Tulevat opettajat (osallistujat) lukevat kaksi lyhyttä taustatietopakettia liitteistä:

Liite 1: Oppimistieteen tutkimustulokset opiskelijoiden oppimiseen liittyen

Liite 2: Teknologis-pedagoginen sisältötietämys (TPACK) opettajien tietopohjana

Nämä liitteet avaavat TPACKin aiheita ennen oppituntia.

(2) Oppitunnin aikana:

a. Oppitunnin alussa tulevat opettajat jaetaan neljän hengen ryhmiin.

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b. Pienissä ryhmissään he keskustelevat TPACKin (digipedagogiikka) olennaisista piirteistä ja osatekijöistä. He myös merkitsevät ylös TPACKin (digipedagogiikka) ja PCK:n (perinteinen pedagogiikka) yhtäläisyyksiä ja eroja. Tähän kuluu noin 10 minuuttia.

c. Pienryhmäkeskustelun aikana he keskustelevat myös siitä, miten TPACKia käytetään suunniteltaessa yhdistettyä ja etäopetusta. He pitävät muistiinpanonsa valmiina koko ryhmäkeskustelua varten. Tähän kuluu noin 10 minuuttia.

d. Ohjaaja seuraa ryhmäkeskusteluja, vastaa kysymyksiin ja antaa palautetta. Tähän kuluu noin 10 minuuttia.

e. Koko ryhmän keskustelun aikana tulevat opettajat jakavat muistiinpanonsa muun luokan kanssa. Tähän kuluu noin 5 minuuttia.

f. Osallistujien jakamisen jälkeen ohjaaja tiivistää TPACKin (digipedagogiikka) perusnäkökohdat ja sen, miten sitä voidaan toteuttaa luokkahuoneessa. Tähän kuluu noin 15 minuuttia.

g. Sen jälkeen tulevat opettajat palaavat pienryhmiinsä. Ryhmissään he suunnittelevat opetustunnin/tuokion, jolla esitellään peruskoulun oppilaille digitaalisten työkalujen käyttöä tunneilla. Tähän kuluu noin 20 minuuttia.

h. Jokainen ryhmä laatii ensimmäisen luonnoksen opetustuokiosta/tunnista.

Arviointityökalut:

(1) Vertaisarviointi tarvitaan selvittämään miten ryhmä oppii

(2) Itsearviointi on tarpeen oman edistymisen arvioinniksi.

(3) Esseen kirjoittaminen on olennaista ryhmäprosessien ymmärtämiseksi.

(4) Rubriikki-arviointia käytetään suunniteltujen toimintojen arvioimiseen.

Liite 1 (englanniksi)

Learning science research outcomes related to students learning

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Learning is analyzed here based on social constructivist starting points and it is described as a goal-oriented or intentional, social-interactive, contextual, constructive, self-regulated and reflective process. The aim is to analyze, what kinds of activities of learners and teachers are supportive for learning and what are the skills and attitudes to be learned by learners in order to learn.

What we mean with the term constructivism? Constructivism (social constructionism) has its origins in social psychology (Gergen, 1985). It emphasizes social nature of human functioning and how they are constructing and reconstructing their own interpretation of reality based on their previous experiences, conceptions, beliefs, attitudes and values- not receiving it as a ready construct. However, conceptions can make learning challenging because conceptions can vary from learner to learner, and they could be very different to scientific concepts. These conceptions are called misconceptions (Smith III et al., 1994). Constructivism assumes that a learner has a fundamental wish to maintain and strengthen his/her previous knowledge or conceptions or knowledge structures and their sense of identity (how they look at themselves through the eyes of others). A learner does this in interaction with important other people. Consequently, conceptions and other perspectives are not totally individual but partly similar for people from the same subculture. Important other people, for example a teacher, are those who are willing to maintain and strengthen a learner's sense of identity (how the learner sees himself as a learner and as a person) (Rijsman, 1984)

Although the subculture strongly influences person's thinking and acting, he or she can change his/her perspectives. The key process to do this is reflection in action (Schön, 1988): reflecting upon the way one is acting as closely related to the action itself as possible. With the help of other people, one can become able to look at oneself and ones' actions. In learning it is important to reflect upon ones' perspectives and to become aware of the differences in perspectives. Reflection therefore is a key process of learning.

Social constructivism or socio-constructivism means that social processes are important for learning, both in educational situations, in working situations and in life contexts. Learning is a constructive process in which deep processing of information means interaction with other perspectives. Learning is a social interactive process and interaction between learners and of learners with other people is very important. Their subculture, previous experiences and backgrounds as well as the significant others in their environment play important roles in constructing perspectives. Learning is the process through which people construct collective meaning and develop and construct their perspectives of situations.

Self-regulation is also an important characteristic of learning (Zimmerman, 2002). Self-regulation allows learners to learn more effectively because they are able to set clear goals for themselves and monitor their progress based on their goals and strategies. Self-regulation allows learners to become less reactive and more proactive in their learning. Self-regulation is important in on-line learning.

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Contextualizing learning aims to bring learning into context, which can make the learning experience more meaningful, engaging and internally motivating for the learners. This in turn can connect the learning experience more closely to life outside the classroom. Contextual learning helps learners develop their professional identity and efficacy as a future member of society and working life. Contextualization of learning could introduce learners to other perspectives of peers and disciplines and how those align with their own and in their unique contexts (Bouillion & Gomez, 2001).

A common characteristics to learning and discussion in the cafeteria is social interaction. However, learning need to be intentional or goal oriented activity, which cafeteria discussion does not necessary be. Intentional learning occurs as a result of activities where learning is a deliberate goal for the learner. Bereiter and Scardamalia (1989) use the term intentional learning "to refer to cognitive processes that have learning as a goal rather than an incidental outcome" (p. 363). In the school context, goals are coming from the official curriculum and, therefore, the teacher should support the learner to internalize the goals or to motivate the learner. In school context, the learner has to invest often efforts in learning, and reflection. Intentional learning can also be understood as management learning strategies and implies conscious awareness of metacognitive strategies for monitoring the learning (Blumschein, 2012).

To summarize: While planning and implementing teaching it is worth to remember that learning is a goal-oriented or intentional, social-interactive, contextual, constructive, self-regulated and reflective process.

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Liite 2 (englanniksi)

Technological pedagogical knowledge (TPACK) as a model for teachers' knowledge base

Teachers need knowledge and skills for the instructional design, including knowledge and skills needed for using digital tools and platforms or educational technology. *Technological Pedagogical Content Knowledge* (TPACK) have been suggested as a knowledge and skill base needed for this instructional design (Mishra & Koehler, 2006). TPACK combines Shulman's structure of pedagogical content knowledge (PCK), content or subject matter knowledge and knowledge and skills needed for the use of digital tools and -environments.

Shulman's original model divides teacher knowledge into subject matter (content) knowledge (CK or SMK), pedagogical content knowledge (PCK), and general pedagogical knowledge (GPK) (Carlsen, 1999; Hashweh, 2005), which is in line with several other suggestions for a teacher knowledge base, such as Verloop et al. (2001). In addition to these three areas of knowledge, a teacher needs contextual and curriculum knowledge (Gess-Newsome & Lederman, 1999). However, it is challenging to describe use of knowledge as a sequence, because the work of a teacher is complex and a teacher utilizes at the same time various domains of knowledge.

Subject matter knowledge (SMK) includes conceptual, factual, and procedural knowledge in a certain SMK domain. A teacher needs to understand the nature of SMK, that is, the epistemological and ontological aspects of the subject matter (Shulman, 1987). Because the SMK is broad, curricula designers in various countries have reduced and emphasized core-ideas and knowledge in the curricula. Core ideas and knowledge are significant and important across the domains of SMK and could be used for planning investigations, explaining phenomena and solving problems (Krajcik et al., 2021). Core ideas and knowledge are also relevant in the personal, local and global contexts.

Pedagogical content knowledge (PCK) is the synthesis of the combined knowledge needed to teach a certain topic or an amalgam of SMK and knowledge of pedagogy (Carlsen, 1999). PCK is "the knowledge that teachers bring forward to design and reflect on instruction" (Gess-Newsome, 2015, p. 36) and includes, for example, the following areas of teacher knowledge: knowledge about 1) teaching or instructional strategies, assessment strategies, and collaboration strategies (shortly teaching methods); 2) student interest, motivation, and the learning of conceptual and procedural knowledge and skills; 3) learners, (mis)conceptions, experiences and thinking skills, and cognitive and affective demands of the tasks and activities; 4) the resources available to support teaching and scaffold learning; 5) curriculum knowledge and goals for student learning (Loughran et al., 2008). Carlson & Daehler (2019) emphasize the complex layers of PCK and introduce collective PCK (cPCK), personal PCK (pPCK), and enacted PCK (ePCK). Because of this collective nature of PCK, it is important that teachers continuously discuss and reflect on their teaching and student learning. In the European tradition,

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especially in Germany, France, and the Nordic countries the term “didactics”, or more precisely, “didactical transformation” (in German, didaktische transformation) (Kansanen, 2002) refers to processes that are similar to those included in PCK. PCK is needed in Pedagogy. Pedagogy is a way, how a teacher approaches to his or her teaching and having different views in his/her mind, such as those five views above (Husbands & Pearce, 2012). Digital pedagogy or shortly digi-pedagogy emphasizes the use of digital tools in in teaching and learning. Digi-pedagogy may be applied to online, hybrid, and face-to-face learning environments.

Although PCK is a theory for teaching, it takes into account learning science research outcomes, which emphasize factors supportive for learners and groups in their engagement in learning (Sawyer, 2015). For example, prior knowledge has been found to be one of the important factors for learning (Ausubel, 1968). For example, Hattie and Donoghue (2016) argued that science inquiry promote learning only when the prior knowledge has been recognized. Students’ collaboration and interaction and contextualizing of learning are examples of factors that support learning and engagement (Sawyer, 2015).

An important characteristic to science teaching is the students’ interaction with nature and phenomena. In practice a teacher guide students to make sense of the phenomena through a demonstration or through engaging students in scientific and engineering practices. Scientific and engineering practices are similar to those of professional scientists, like reasoning, critical thinking, and knowledge practices, such as questioning, observing, inferring, classifying, predicting, measuring, interpreting and analyzing, as a part of learning (Krajick & Merritt, 2012).

The third main category of teacher knowledge is general pedagogical knowledge (GPK) (Gore & Gitlin, 2004). Morine-Dershimer and Kent (1999) argued that general pedagogical knowledge consists of the following knowledge areas: 1) classroom management and organization; 2) instructional models and strategies; and 3) classroom communication and discourse.

TPACK describes the knowledge base, a teacher needs for effectively teaching with technology (see Figure 1., Mishra & Koehler, 2006). The main idea of TPACK is stated as follows: *The basis of good teaching with technology requires an understanding of the representation of concepts using technologies; pedagogical techniques that use technologies in constructive ways to teach content; knowledge of what makes concepts difficult or easy to learn and how technology can help redress some of the problems that students face. (Mishra and Koehler, 2006, pp. 1028–1029).*

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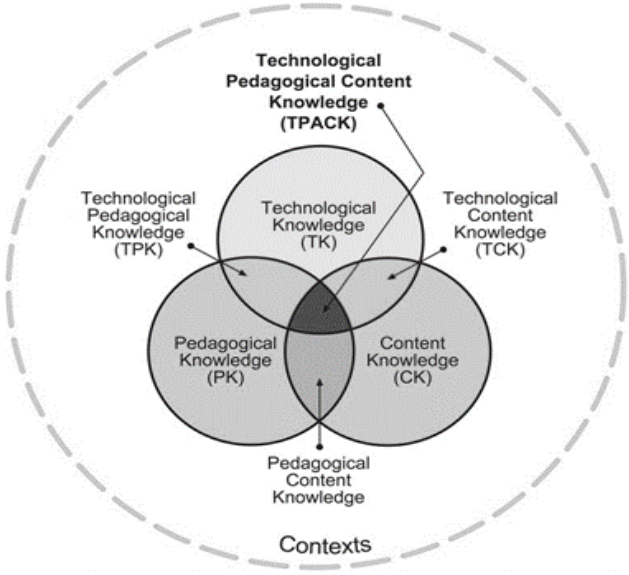

Figure 1. The TPACK framework

Several researchers have characterized the seven domains of TPACK (Mishra and Koehler, 2006; Lin et al., 2013; Koehler et al., 2017). From the point of view of versatile teaching and learning with digital tools and platforms, teachers should know each domain of knowledge in the TPACK model. Three domains, or SMK, PCK and GPK, were already introduced above.

Technological knowledge (TK) is knowledge about the use of digital tools and digital platforms or education technology. Digital tools are considered as tools, which process digital signals and are available in various environments and devices, such as cloud services, laptops and mobile phone. Various tool applications are used for processing text, numbers, pictures, videos and music. Social media tools and digital platforms or distance teaching and learning environments are adaptable for face-to-face, flexible, remote and mobile learning. In addition, digital learning materials such as learning games with interactive learning content are essential part of the learning environment. Furthermore, special digital tools are needed in various fields, like micro computer labs and modelling tools in science education. Robots, laser cutters and 3d printers are nowadays used in technology education (Fuad et al., 2020). Technological content knowledge (TCK) is in turn knowledge about applying technology to represent CK, but this does not relate to its pedagogical purpose.

Technological pedagogical knowledge (TPK) is knowledge about applying various technologies in pedagogy for teaching and learning all subject domains rather than being focused on specific content knowledge, such as using Zoom to organize students' distance learning. Consequently, a teacher employs TPK or Digi-pedagogy when he or she uses digital tools or guides students to utilize digital tools in learning. This TPK includes TCK or the skills needed for using digital tools, platforms, and digital environments for teaching and learning, as well as the knowledge and skills needed to support students' engagement, learning, and well-being in digital environments (Greenhow et al., 2020).

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Consequently, TPACK refers to knowledge about the use of digital tools in teaching and learning. In general, a teacher has high level TPACK, when subject matter, pedagogy, and use of digital tools are well integrated and facilitate students' engagement, learning and well-being in a specific context (Greenhow et al., 2020). Although, this view of TPACK seems teacher centered, it emphasize teacher knowledge he/she employ in when he/she guide students to recognize their conceptions and experiences, work in a small group, interact with other students and be active in learning.

Loughran, Mulhall and Berry (2004) have suggested a list of eight questions, supportive for employing PCK in the planning of lessons and named the collection of questions as "The Content Representation (CoRe) tool, which could be used for structuring pedagogical content knowledge (PCK). In order to take into account the use of digital tools in teaching and learning, we slightly modified this tool for better taking into account TPACK. The modified CoRe or the Content and Digi Representation tool (CoDiRe) is:

- What do you want students to learn about the topic or what are the core ideas/big ideas/key concepts and models related to the topic? Do you have specific aims related to the use of digital tools and platforms in learning?
- Why it is important (meaningful and relevant) for students to learn this topic (need-to-know)? Is it possible to support the development of interest through the use of digital tools, for example, in the selection of appropriate context for learning?
- What else do you know about this topic - not going to teach students (the level of content)?
- What do you know about students' everyday experiences in the area of the topic? What experiences students have about the planned use of digital tools (know based on previous studies or need to ask students during previous lesson)
- What do you know about students' conceptions/ misconceptions related to the topic and how does it affect the teaching of the topic? Can you support students to recognise their conceptions through the use of digital tools, for example through on-line diagnosis test?
- How school context influences the teaching of this topic? (Student, classroom and school context). What kind of digital tools are available at school considering your aims? Do you need to book the tools beforehand?
- What kind of pedagogy you are planning to use, and how well the pedagogy suited for the topic? (knowledge-in-use)? What kind of digital tools support your pedagogy? Is the information easier available through the use of web-browsers or is it possible to support the observations or measurement through the use of digital tools, such as data-logger, camera, video camera, thermal camera or microscope?
- How are you going to evaluate student learning (knowledge-in-use)? What kind of digital tools support formative, summative and self-evaluation? Can you use for example Socrative, Kahoot or blog in evaluation?

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4.2. Moduuli 4, Oppitunti 2

Aihe: Oppitunnin suunnittelu Content and Digi Representation -työkalun (CoDiRe) avulla

Kesto: 2 tuntia (120 minuuttia)

Oppimistavoitteet: Tämän oppitunnin päätteeksi osallistujat osaavat:

(1) Ottaa huomioon erilaiset näkökulmat oppitunnin suunnittelussa,

(2) Keskustella siitä, miten opettaja voi tukea opiskelijoiden tiedon rakentamista sosiaalisesti perinteisessä luokkaympäristössä,

(3) Luetteloida TPACKin olennaiset piirteet.

Opetusmenetelmät/tekniikat:

(1) Ryhmäkeskustelut,

(2) Parityöskentely,

(3) Kysymys-vastaus osallistujien kesken,

(4) Kysymys-vastaus ohjaajan ja osallistujien kesken.

Oppimis-opetusaktiviteetit:

(1) Ennen oppituntia: Tulevat opettajat (osallistujat) lukevat kaksi lyhyttä taustatietopakettia liitteistä:

Liite 1: Oppimistieteen tutkimustulokset liittyen opiskelijoiden oppimiseen

Liite 2: Teknologis-pedagoginen sisältötietämys (TPACK) opettajien tietopohjana

Nämä liitteet avaavat, miten TPACKia voitaisiin käyttää opetuksen suunnittelussa ja opiskelijoiden oppimisen tukemisessa.

(2) Oppitunnin aikana:

a. Opettaja aloittaa yhteenvetämällä, että oppimista ymmärretään tässä tavoitteellisena tai tahallisena, sosiaalisena, vuorovaikutteisena, kontekstuaalisena, rakentavana, itseohjautuvana ja reflektoivana prosessina. Tähän kuluu noin 10 minuuttia.

b. Opettaja tiivistää TPACKin rakenteen ja miten Content and Digi Representation -työkalua (CoDiRe) voidaan käyttää perinteisen oppitunnin suunnittelussa. Tähän kuluu noin 20 minuuttia.

c. Osallistujien jakaannuttua neljään ryhmään, heitä pyydetään täyttämään alla oleva taulukko ymmärtääkseen, miten Content and Digi Representation -työkalu (CoDiRe) ottaa huomioon oppimistieteen tutkimustulokset (Liite 1). Tähän kuluu noin 30 minuuttia.

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Oppimista tukevat tekijät	Miten CoDiRe korostaa oppimista tukevia tekijöitä?
Tavoitekeskeinen (goal-orientation) tai tahallinen (intentional)	
Sosiaalisesti vuorovaikutteinen (social-interactive)	
Rakentava (constructive)	
Kontekstuaalinen (contextual)	
Reflektoiva (reflective)	
Itsesäätelyyn kykenevä (self-regulated)	

d. Yksi ryhmä esittelee taulukkonsa toiselle ryhmälle, ja päinvastoin. Esittelyn jälkeen ryhmät muokkaavat alkuperäistä taulukkoaan sen perusteella, mitä he oppivat toiselta ryhmältä.

e. Luennoitsija tiivistää, miten Content and Digi Representation -työkalu (CoDiRe) korostaa tekijöitä, jotka tukevat oppimista. Tähän kuluu noin 15 minuuttia.

f. Tulevat opettajat palaavat sitten pienryhmiinsä. Ryhmissään he suunnittelevat opetusaktiviteetin, jossa käytetään Content and Digi Representation -työkalua (CoDiRe) tietyn aiheen esittämiseen peruskoululaisille. Opiskelijat päättävät aiheen. Tähän kuluu noin 20 minuuttia.

(3) Oppitunnin jälkeen: Osallistujien on kirjoitettava yhden oppitunnin essee, jossa he kuvaavat, miten he käyttävät Content and Digi Representation -työkalua (CoDiRe) oppituntien suunnittelussa.

Arviointityökalut:

(1) Kysymys-vastaus: Tärkein arviointityökalu tällä oppitunnilla on kysymykset ja vastaukset oppilaiden kesken sekä ohjaajan ja osallistujien kesken.
(2) Essee: Essee-tehtävä antaa palautetta ohjaajalle päätöksentekoa varten siitä, kuinka paljon osallistujat saavuttavat oppitunnin alussa luetellut tavoitteet.

4.3. Moduuli 4, Oppitunti 3

Aihe: Projektioppiminen

Kesto: 2 tuntia (120 minuuttia)

Oppimistavoitteet: Tämän oppitunnin päätteeksi osallistujat osaavat:

1.Selittää, miten projektiperustainen oppiminen ottaa huomioon oppimistieteiden tutkimustulokset.

2.Selittää, miten projektioppiminen ottaa huomioon TPACK:in ja CoDiRen.

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3.Suunnitella projektipohjainen oppimiskokonaisuus.

Opetusmenetelmät/tekniikat:

(1) Ryhmäkeskustelut

(2) Parityöskentely

(3) Kysymyksiä ja vastauksia osallistujien kesken

(4) Kysymyksiä ja vastauksia opettajan ja osallistujien kesken.

Learning-Teaching Activities:

(1) Ennen oppituntia: Tulevat opettajat (osallistujat) lukevat kolme lyhyttä taustatietopakettia liitteistä:

Liite 1: Oppimistieteen tutkimustulokset opiskelijoiden oppimiseen liittyen

Liite 2: Teknologis-pedagoginen sisältötieto (TPACK) opettajien tiedon perustana

Liite 3: Projektipohjainen oppiminen korostaa pedagogiaa oppimisen ja osallistumisen tukemiseksi

(2) Oppitunnin aikana:

a. Opettaja esittelee lyhyesti projektiperustaisen oppimisen keskeiset periaatteet. Kesto noin 10 minuuttia.

b. Osallistujat jaetaan kolmen hengen ryhmiin ja heitä pyydetään täyttämään alla oleva taulukko ymmärtääkseen, miten projektiperustainen oppiminen ottaa huomioon oppimistieteiden tutkimustulokset (Liite 1). Kesto noin 15 minuuttia.

Oppimista tukevat tekijät	**Miten projektiperustainen oppiminen korostaa oppimista tukevia tekijöitä?**
Tavoitekeskeinen (goal-orientation) tai tahallinen (intentional)	
Sosiaalisesti vuorovaikutteinen (social-interactive)	
Rakentava (constructive)	
Kontekstuaalinen (contextual)	
Reflektoiva (reflective)	
Itsesäätelyyn kykenevä (self-regulated)	

c. Yksi ryhmä esittelee taulukkonsa toiselle ryhmälle ja päinvastoin. Esittelyn jälkeen ryhmät muokkaavat alkuperäistä taulukkoaan sen perusteella, mitä he oppivat toiselta ryhmältä. Kesto noin 15 minuuttia.

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d. Luennoitsija tiivistää, miten projektiperustainen oppiminen korostaa oppimista tukevia tekijöitä. Kesto noin 15 minuuttia tai niin.

e. Sen jälkeen tulevat opettajat palaavat pienryhmiinsä. Ryhmissään he suunnittelevat projektiperustaisen oppimisen opetustoiminnan, jolla esitetään tietty aihe toisen asteen koululaisille etäopetuksen kautta. Opiskelijat päättävät aiheen. Kesto noin 30 minuuttia.

f. Opiskelijat analysoivat, miten heidän suunnitelmansa ottaa huomioon CoDiRe-työkalun näkökulmat. Kesto noin 20 minuuttia tai niin.

Oppitunnin jälkeen: Yhden oppitunnin essee, jossa kuvataan, miten suunniteltu etäprojektipohjainen oppimisen opetustoiminta ottaa huomioon oppimista tukevat tekijät ja CoDiRe-työkalun näkökulmat.

Arviointityökalut:

1.Kysymykset ja vastaukset: Tämän oppitunnin ensisijainen arviointityökalu on oppilaiden kysymykset ja vastaukset opettajan ja osallistujien välillä.
2.Essee: Essee-tehtävä antaa palautetta opettajalle päätettäessä, kuinka hyvin osallistujat saavuttavat oppitunnin alussa asetetut tavoitteet.

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Liite 3 (englanniksi)

Project-based learning emphasizes pedagogy supportive for learning and engagement

The idea of project-based learning (PBL) or project pedagogy has been suggested several times as an approach to a teaching reform and for engaging students in collaborative learning. On the other hand, the word “project” is used in various ways and all projects are not necessarily PBL in the way it is understood in this chapter. PBL is based on the ideas of John Dewey in the 1930s at the University of Chicago Laboratory School (1896–1903), where students engage in active and collaborative learning or project type of activities (Mayhew & Edwards, 1965). However, based on Thomas’s (2000) review on PBL studies, the studies lack common understanding, what project type of learning, such as PBL, means.

The PBL model, presented in this chapter is based on the ideas of Blumenfeld, Krajcik and their colleagues (Blumenfeld et al., 1991; Krajcik & Shin, 2015). In a PBL, students are engaged in a problem-oriented, meaningful learning in a small group, i.e. a project. The aim in the PBL is to support students to work in small groups to create artefacts that combine disciplinary core ideas or concepts with their previous knowledge. Artefact is a concrete output of learning, it is built by students, which can be, for example, a model, which describes a natural phenomenon based on the collected evidence. Artefacts are typically constructed with digital tools, for example, with data-logging or modelling tools.

Learning sciences research (Appendix 2) describes learning as a social-interactive, contextual, constructive, self-regulated and reflective process. This research has shown that students can’t learn SMK without engaging actively in constructive, collaborative, contextual and reflective activities and, moreover, disciplinary practices, for example scientific practices, and they can’t learn these practices without learning the SMK through actively construct their understandings by working with and using ideas in real world contexts. The key features of PBL are (Blumenfeld et al, 1991; Krajcik & Czerniak, 2013) are:

- PBL starts with a driving question, which contextualize learning and connect new ideas to previous ideas and experiences and guide learning process during the PBL (Greeno, 2006; Lave & Wenger, 1991).
- PBL focus on learning objectives/outcomes of the curriculum/standards that students are required to demonstrate mastery. Typically, the curriculum set learning objectives/outcomes to the learning of the scientific practices and use of technology. Consequently, these objectives/outcomes are also emphasized in PBL
- Students explore the driving question through participating in scientific practices – processes of inquiry and problem solving that are central to expert performance in the discipline. Moreover, they use digital tools in this exploring. As students explore the driving question, they learn and apply important ideas in the discipline. They investigate questions, propose hypotheses and explanations, argue for their ideas, challenge the ideas of others, and try out new ideas.
- Students engage in collaborative activities to find solutions to the driving question. This mirrors the complex social situation of expert problem solving.

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- Students create through the use of digital tools a set of tangible products that address the driving question. These are shared artifacts, publicly accessible external representations of the class's learning.
- While engaged in the scientific practices, students are scaffolded in order to help them participate in activities normally beyond their abilities.

Consequently, to support students learning or in forming useable understanding, knowing and doing cannot be separated, but rather combined in planning, inquiring, problem-solving, decisions making and explaining real-world phenomena situations. Learning is a kind of knowledge building, which refers to the process of creating cognitive artefacts, like concepts and models, as a result of common activity. Common activity means that students develop understandings through sharing, using, and debating ideas back and forth with others (Blumenfeld et al., 1991).

Finally, Krajcik and Shin (2015) emphasized the importance of cognitive tools, such as graphical representations in the computer screen, which help learners see patterns in data. Therefore, various digital tools could be considered as cognitive tools because they allow learners to carry out tasks. Consequently, the design of the teaching modules were based on the assumption that the school science should better represent real scientific practices, and support collaboration in order to make science learning engaging and support learning (Andersson, 2007; EU, 2004; Tytler, 2014).

Examples of lessons where the use of digital tools have been integrated to learning

Making sense of phenomena related to moving objects through project based learning and the use of digital tools

We have engaged together with physics teaching in planning PBL teaching modules to secondary education. Moreover, we have made research on students' engagement and learning and recognized that PBL support both engagement in physics learning and learning of physics (Inkinen et al., 2018; Inkinen et al., 20220; Schneider et al, 2020). The following description is an example of a teaching module, designed together with physics teachers (Juuti et al, 2020).

The teacher begins the lesson by introducing the topic of the lesson: "We will look at different movements, the change in movement, and the reasons behind the change. We design experiments, model and discuss models. Experiments will be conducted with a video analysis software. Movements could be captured by a mobile phone or videos could be taken from the internet for analysis. A specific driving question is: Why do different objects take different times to fall when they are dropped from the same height. What is the motion of a falling object like? In order to understand the driving question, let's look at the drop of coffee filters. I have one filter in one hand and two nested filters in the other hand. What do you think, how do filters fall? Do they fall at the same time? Look closely at what is happening. " Based on the teacher demonstration, it is found that a heavier object hits the ground first.

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The teacher continues the demonstration by doubling the masses of falling objects. First demonstration: mass of the first falling object m – mass of the second falling object 2m; the following demonstrations: 2m – 4m; 4m – 8m; 8m – 16m; 16m – 32m. Before each drop, a prediction is made of how the situation will change or whether the situation will change. Students did not notice a difference between the first two experiments, but in the third experiment, the filters hit the ground at almost the same time. After the demonstration, the teacher shows couple of videoclips of a parachutist jumping. Students are asked to summarize their findings in four-student group first independently and then combine the findings. The student report their findings to the online learning environment with two sentences.

The summaries in the platform are analyzed in a whole group discussion. The classroom recognized that the summaries focused to movement as such and to the reasons why a movement change or not change. The teacher says that the demonstration was the anchoring phenomenon of the upcoming study period, which introduces the students to the theme of the five lessons of the course: "Later, we will explain in more detail what we all noticed. At the moment, it may seem confusing, but let's start with this. Natural phenomena are often not simple. " The teacher re-introduces the driving question for the course: "Why does it take different objects to fall at different times when they are dropped from the same height?"

The teacher guides the students into 4-student groups and asks them to draw up research questions on the basis of which the phenomenon can be studied and an answer to the driving question obtained. Questions were asked to write to an online learning environment. The teacher wrote supportive questions to online learning environment chat in order to help students to orient themselves in making the questions:

- *What do you already know about the topic?*
- *What do you want to find out by studying the phenomenon? In what way should your question be changed so that it is clear to everyone what phenomenon you are going to study?*
- *Is it clear from the question what you intend to measure or observe? How should your question be changed so that everyone knows what you are going to measure?*
- *What do you aim to learn when doing investigations?*

Students formulate questions related to motion (e.g., how does velocity change during a fall? Is the speed of a falling object the same throughout the fall?) And questions related to the causes of motion change (e.g., how does the mass of a falling object affect the fall time? size (crumpled filter / non-crumpled filter) affects the fall time?).

The teacher invites students back and asked students to classify the questions, posed in the learning environment in a meaningful way. The teacher says, "After you have classified the questions, your group will introduce them to the other group in order to discuss and compare the classification of other group. Make a common classification that you present to the whole class. The teacher asks students to choose questions that can be used to find the answer to the driving question. The teacher shows the questions:

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1. Categorize the questions you create in a meaningful way. After 8 min working you will be invited back and two groups will be combined.
2. Introduce your group classifications to another group. (8 min)
3. Compare classifications and try to come up with a common classification. (5 min)
4. Introduce the final classification, or Classification Criteria, and a few examples of each class to other students.

The groups present the classification criterion and examples of questions to the whole class and justify why the question is good for the phenomenon under consideration or takes the process forward.

The teacher says that next we start to study the anchoring phenomenon or similar phenomena based on the questions. First, a question or questions are selected to help investigate the falling motion (e.g., in what situation does the velocity of the falling object not change? What is the motion of the falling object then? What is the change in the speed of the falling object?). The reasons for the change in movement will be examined later. In this context, experiments related to the change of movement are not performed, but the movement itself is examined. The teacher demonstrates, how a data-logger or automated object tracking and video is used and data analysis done. Teachers shows how an app creates trajectory, position, and velocity graphs for the object.

Next, the phenomenon was examined on the basis of movement-related questions. Students begin to design research in the direction of research questions in a small group. The teacher visits the groups and guides the use of mobile phone in capturing the movement. As students go further in measurement and modeling activities, the teacher submitted guides through the chat, such as:

- What is your research question? Have you acted to get an answer to the question?
- What is your test setup like? Does it provide an answer to your question? Why? Why not?
- What model have you ended up with? What is its representation?
- Why did you end up with this representation? Would there have been other possible representations?
- What is the material? What do you claim? What is the evidence behind the claim? Does the material support the claim?
- In what way is the model you present based on the collected data?

At the beginning of the next lesson, the group presents the results, such as graphical presentations, to another group. After the presentations, a joint discussion takes place, concluding that the movements can be grouped into two groups: a movement with constant velocity and movements in which the velocity changes. The students introduced their verbal and graphic patterns that described the studies movements. Under the guidance of the teacher, mathematical models describing the movements are also built and the use of the models in solving various problems is practiced.

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4.4. Moduuli 4, Oppitunti 4

Aihe: Opettajien episteeminen ymmärrys digitalisaatiosta

Kesto: 2 tuntia (120 minuuttia)

Oppimistavoitteet: Tämän oppitunnin päätteeksi osallistujat:

1. Ymmärtävät digitalisaation käsitteen ja digitalisaation yhtenä koulutuksen kehityksen ajureista.
2. Osaavat tehdä eron digitalisaation ja digitoimisen välillä.
3. Osaavat selittää, miksi digitalisaation ymmärtäminen ilmiönä ja osana yhteiskuntaa on olennainen osa opettajien digipedagogista osaamista.

Opetusmenetelmät/tekniikat:

1.Yksilötyö,

2.Keskustelu,

3.Kysymykset ja vastaukset (K&V),

4.Yhteisöllinen oppiminen.

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Oppimis-opetusaktiviteetit:

(1)Ennen oppituntia: Tulevat opettajat (osallistujat) lukevat yhden lyhyen taustatietopaketin liitteestä ja *kolme taustaa käsittelevää artikkelia digitalisaatiosta ja opettajien digipedagogisesta osaamisesta.

*Korhonen, T., Juurola, L., Salo, L., & Airaksinen, J. (2021). Digitisation or Digitalisation: Diverse Practices of the Distance Education Period in Finland. *CEPS Journal, 11* (Sp.Issue (2021): Education in the Covid-19 Era), 165- 193. https://doi.org/10.26529/cepsj.1125

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(2) Oppitunnin aikana:

a. Oppitunnin alussa tulevat opettajat jaetaan neljään ryhmään.

b. Pienryhmissään he keskustelevat digitalisaation olennaisista piirteistä ja digitalisaatiosta yhtenä koulutuksen kehityksen ajurina. He tekevät myös muistiinpanoja digitoinnin ja digitalisaation eroista. Tämä keskustelu kestää noin 20 minuuttia.

c. Opettaja pyytää sitten kutakin ryhmää esittämään kolme pää havaintoa keskustelustaan ja helpottamaan keskustelua kannustamalla osallistujia kommentoimaan kunkin ryhmän havaintoja. Opettaja tiivistää keskustelun pääkohdat osoittamalla tärkeimmät aiheet ja pohdinnat. Tämä osuus kestää noin 20 minuuttia.

d. Tulevat opettajat palaavat sitten pienryhmiinsä. Ryhmissään he suunnittelevat kuvitteellisen tapausesimerkin monitasoisesta digipedagogisesta oppimistilaisuudesta. Osallistujat valitsevat luokka-asteen, istunnon teeman ja käytetyt digitaaliset työkalut. He valitsevat esitys muodon ja pitävät lyhyitä esityksiä tapauksesta. Tämä kestää noin 30 minuuttia.

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e. Seuraavaksi opettaja pyytää kutakin ryhmää pitämään esityksensä ja pyytää muita osallistujia antamaan palautetta esityksestä joko esittämällä kysymyksen, antamalla kiitosta tai tekemällä ehdotuksen esittäjille. Tämä kestää noin 30 minuuttia.

f. Tulevien opettajien esitysten ja yhteistyöpalauteosuuden jälkeen opettaja pyytää jokaista heijastamaan ja tekemään muistiinpanoja siitä, kuinka opettajien digitalisaation ymmärtäminen oli näkyvissä esitetyissä tapausesimerkeissä. Loppukeskustelun jälkeen opettaja pyytää jokaista osallistujaa jakamaan yhden näkökulman muiden kanssa ja tiivistää oppitunnin tämän keskustelun jälkeen. Tämä vie noin 20 minuuttia.

Arviointityökalut:

1.Vertaispalautteet oppitunnin aikana. Kysymys-, kehu- tai ehdotuskortit.
2.Itsearviointi kirjoittamalla blogikirjoitus tai essee aiheesta "Tietämyksellinen ymmärrys digitalisaatiosta osana digipedagogista osaamistani".
3.Jatkuva palaute ja ohjaus opettajalta oppituntien ja keskustelujen aikana.

Liite 4 (englanniksi)
Teachers´ epistemic understanding of digitalization

We argue teachers´ need knowledge about digitalisation itself. Epistemic understanding of digitalisation create the foundation for competence to teach digital skills. It´s noteworthy that educational discourse regarding the digitalisation of society lacks a definition of digitalisation. There is often talk about digitisation instead of digitalisation in the educational context (Korhonen et al. 2021). Digitisation refers to a technical process of moving information into digital form, whereas digitalisation pertains to changes in ways of working that utilise digital technology (Tilson et al., 2010). Barras (1986, 1990) views digitalisation on three levels. 1) On the first level, technology is used to enhance the efficiency of existing services. 2) On the second level, technology is used to improve quality in addition to efficiency. 3) On the third level, technology is used to create completely new or adapted services or ways of acting (Barras, 1986; Barras, 1990). It has been noted that in the current educational context teachers have been found to practice and act on the first level of digitalisation. To promote pedagogically meaningful utilization of digitalization of school practices more teachers must acquire better digipedagogical competences i.e., competences that link together technological prowess with the ability to apply and innovate in the now blended school context (Korhonen et al. 2021).

On the third level of digitalization (Barras 1986, 1990), technology in education is seen not only as a tool for teaching, learning, interaction and innovation but also as an object of learning (Korhonen & Lavonen, 2017) and the digipedagogical competence required of teachers in the 21st century includes the teacher's epistemic knowledge of digitalisation, for example, teacher's knowledge and beliefs (Ertmer et al., 2014) about

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digitalisation, digital technology, and its benefits to teaching, as well as its societal impact. Additionally, teachers' awareness of digitalization, technological development, technology itself and increased awareness and increased competence in innovative technologies are important factors in developing teachers' epistemic knowledge of digitalization (Korhonen et al, 2022). These affect teachers' attitudes towards digitalization in education (Korhonen et al., 2021) and their ability to adapt and innovate technology use in pedagogically meaningful ways (Korhonen & Lavonen, 2017).

Lähteet

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4.5. Moduuli 4, Oppitunti 5

Aihe: Opettajien digipedagogisen osaamisen kehittämisen mahdollistavat ja haastavat tekijät

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Kesto: 1 tunti (60 minuuttia)

Oppimistavoitteet: Tämän oppitunnin päätteeksi osallistujat:

1.Tunnistavat opettajien digipedagogisen osaamisen kehittämisen mahdollistavat ja haastavat tekijät.

2.Osaavat selittää, miksi kyky tunnistaa opettajien digipedagogisen osaamisen mahdollistavia ja haastavia tekijöitä on olennainen osa opettajien ammatillista kehittymistä.

Opetusmenetelmät/tekniikat:

1.Yksilötyö,

2.Keskustelu,

3.Kysymykset ja vastaukset (K&V),

4.Yhteisöllinen oppiminen.

Oppimis-opetusaktiviteetit:

Ennen oppituntia: Tulevat opettajat (osallistujat) lukevat lyhyen taustatietopaketin liitteestä.

Oppitunnin aikana:

a. Oppitunnin alussa tulevat opettajat jaetaan neljään ryhmään.

b. Pienissä ryhmissään he keskustelevat opettajien digipedagogisen osaamisen mahdollistavista ja haastavista tekijöistä. Keskustelun päätteeksi he tekevät yhteenvedon mahdollistavista ja haastavista tekijöistä käyttäen yhteistyöalustaa Padletia (joka on valmisteltu etukäteen tämän oppitunnin opettajan toimesta). Tämä keskustelu kestää noin 30 minuuttia.

c. Opettaja pyytää sitten jokaista ryhmää esittämään kolme tärkeintä havaintoa keskustelustaan ja moderoi keskustelua kannustaen osallistujia kommentoimaan muiden ryhmien havaintoja. Ryhmäesitysten ja yhteistyökeskustelun jälkeen jokainen osallistuja kirjoittaa päähuomionsa yhteenvedoksi Padlet-alustalle, jota käytettiin ryhmäkeskustelussa. Tässä oppitunnissa Padletia käytetään yhteistyöllisenä

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luentomuistiinpanoalustana, ja se on osallistujien käytettävissä myös oppitunnin jälkeen. Opettaja summaa keskustelun ja Padletin muistiinpanot osoittamalla pääkohdat ja pohdinnat. Tämä osuus kestää noin 30 minuuttia.

Arviointityökalut:

1.Vertaispalautteen antaminen oppitunnin aikana. Kysymys-, kiitos- tai ehdotuskortit.

2.Jatkuva palaute ja ohjaus opettajalta oppitunnin ja keskustelujen aikana.

Liite 5 (englanniksi)

Enabling and challenging factors of teachers´ digipedagogical competence development

The core challenge in integrating digital pedagogies into teaching and learning is the need for teachers to start teaching 21st-century competencies to their students while simultaneously trying to themselves acquire those 21st-century competencies that will enable them to do so (Korhonen & Lavonen, 2017). In addition to need for teachers´ and students´ simultaneous competence development, there are several enabling and challenging factors affecting teachers´ digipedagogical competence development. In this chapter, we depict the most common factors: attitudes and emotions, tools and services and opportunities for professional learning.

We look at the enabling and challenging factors from the point of view of the theory on the Diffusion of Innovations (Rogers 2003). The development of digipedagogical competences can be seen as a situation where a teacher is adopting an innovation i.e. new ways of working. Rogers' (2003) theory on the diffusion of innovations gives an opportunity to define and examine the characteristics of innovations as well as the process through which innovations are diffused. Innovation is defined by Rogers (2003) as an object, idea or practice that seems new to an individual or group. According to Serdyukov (2017), innovations in the educational context can present themselves as e.g. a new pedagogical theory, teaching method, tool or institutional structure. To qualify as an educational innovation, it must induce significant change in teaching and learning.

Attitudes and emotions

Attitudes and emotions play a role in teachers' commitment to change and have been previously studied in relation to school reform (Hargreaves, 2014; Lasky, 2005). Educational innovation requires teachers to give up familiar practices in which they have high levels of competence and adopt those in which they feel less competent, which leads to them experiencing feelings of insecurity. Innovations also necessitate changes in teachers' attitudes when the traditional ways of teaching and the roles and relationships between teachers and their pupils are altered (Serdyukov, 2017).

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Tools and services
The most common challenges in digipedagogical advancements are the lack of usable and pedagogically relevant tools and services for teaching and learning. For example, equipment availability, network connections, software and service user experience, and service access can enable or hinder the development of digipedagogical competences (Korhonen et al. 2021).

Opportunities for professional learning
Despite various opportunities for professional learning through in-service training, participation in training can be occasional and lack long-term learning plans and continuity (OECD, 2020). For instance, participation in in-service training is voluntary in Finland, apart from a few obligatory training days a year. 20% of teachers do not participate in any kind in-service training in Finland. Barriers to participation include funding, organizing substitute teachers and motivating teachers (Ministry of Education and Culture, 2016). As solutions to these challenges, it has been suggested that in-service training be developed so that it is tied to the everyday work of schools and utilizes networks and sharing best practices (Lavonen et al. 2021, OECD, 2020).

Lähteet

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4.6. Moduuli 4, Oppitunti 6

Aihe: Opettajien digitaalinen muutostoimijuus

Kesto: 1 tunti (60 minuuttia)

Oppimistavoitteet: Tämän oppitunnin päätteeksi osallistujat:

1.Ymmärtävät opettajien digitaalista muutostoimijuutta.

2.Tunnistavat tekijät, jotka vaikuttavat opettajien digitaalisen muutostoimijuuden kehittymiseen.

Opetusmenetelmät/tekniikat:

1.Yksilötyö,

2.Keskustelu,

3.Kysymykset ja vastaukset (K&V),

4.Yhteisöllinen oppiminen.

Oppimis-opetusaktiviteetit:

(1) Ennen oppituntia: Tulevat opettajat (osallistujat) lukevat lyhyen taustatietopaketin liitteestä.

(2) Oppitunnin aikana:

a. Oppitunnin alussa tulevat opettajat jaetaan neljään ryhmään.

b. Pienryhmissään he keskustelevat opettajien muuntavan digitaalisen toimijuuden käsitteestä ja sen kehittymiseen vaikuttavista tekijöistä. Osallistujat tutustuvat digitaalisiin työkaluihin ja sovelluksiin, jotka on lueteltu seuraavalla verkkosivulla: 75 digital tools and apps teachers can use to support formative assessment in the classroom (nwea.org). Jokainen osallistuja valitsee 1-2 työkalua ja pohtii, miten opettajat voivat käyttää näitä työkaluja muuntavan digitaalisen toimijuuden kehittämisessä. Tämä keskustelu ja ryhmätyö kestää noin 40 minuuttia.

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c. Tämän jälkeen ohjaaja pyytää jokaista ryhmää esittelemään kolme tärkeintä havaintoa ja ideaa keskustelustaan, ohjaten keskustelua kannustaen osallistujia kommentoimaan muiden ryhmien havaintoja. Ohjaaja tiivistää keskustelun pääkohdat osoittaen pääaiheet ja pohdinnat. Tämä osuus kestää noin 20 minuuttia.

Arviointityökalut:

(1) Vertaispalaute oppitunnin aikana: Kysymys-, kehu- tai ehdotuskortit.

(2) Jatkuva palaute ja ohjaus opettajalta oppitunnin ja keskustelujen aikana.

Liite 6 (englanniksi)

Teachers´ transformative digital agency

Teachers´ epistemic understanding of digitalization, technological pedagogical knowledge and skills (TPACK) and the enabling and challenging factors of teachers´ digipedagogical competence development culminate into the discussion on the concept of teachers´ transformative digital agency. Lund & Aagaard (2020) depict the digital dimension in teachers' transformative agency and state that technology has been traditionally viewed in the educational field as a tool that mediates and serves people in certain contexts and in specific ways. In fact, there has been less focus in looking at the change potential that digital technology has and in how educational settings and practices can be changed. Lund and Aagaard found that the impact of digitalization on changes in the environment, social practices and concept of knowledge and thus to the individual and community create a special need for teachers and teacher educators to look at transformative agency through digitalization and the digital realm. Lund and Aagaard describe trends that include how phenomena are digitally represented, how communicative spaces emerge, how problem-solving becomes collective and collaborative, and how suspending constraints in space and time to explain why digitalization impacts our epistemic practices.

Further, Lund and Aagaard (2020) characterize *transformative digital agency* through the competence requirements relating to agency. Focal issues facing teachers' and teacher-educators' agency is their capability to identify educationally challenging situations and utilize digital resources to transform these situations into constructive teaching. From the teachers' and teacher-educators' professional learning perspective, transformative digital agency plays a central role in recognizing the epistemic changes brought by digitalization. It is also important to recognize competences related to digital technology and technology itself as well as the adaptive competence of using digital technology pedagogically in teaching and interaction. It is pivotal to think about how technology is situated in the goals and aims set for learning and teaching goals and

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whether technology is viewed as a mere tool for learning or are technology and digitalization also objects of learning. Teachers should be able to meaningfully situate both the instruments and content of these elements into their multimodal teaching and interaction.

A study by Korhonen et al. (2022) on teachers' professional learning experiences reflected Lund and Aagaard's (2020) main goal for transformative digital agency: the ability to identify educationally challenging situations and utilize digital resources to transform these. The study confirmed the view of digital and epistemic knowledge's relevance to teachers' transformative agency. Digitalization and its ever-evolving digital technology demand teachers to have awareness of both the development of technology and its impact. Epistemic knowledge of digitalization is among the factors that enable teachers' transformative digital agency and promote the integration of digital pedagogies into teaching and learning.

Lähteet

Korhonen, T., Salo, L., & Packalén, M. (2022). Developing Teachers´ Transformative Digital Agency through Invention Pedagogy In-service Training. In T. Korhonen, K. Kangas, & L. Salo (Eds.), Invention Pedagogy: The Finnish Approach to Maker Education (1 ed., pp. 202-218). Routledge. https://doi.org/10.4324/9781003287360-18

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MODUULI 5: OPPIMISEN JA OPETTAMISEN PROSESSIT HYBRIDI- JA MONIMUOTO-OPETUKSESSA

Anna Bogacz, Społeczna Akademia Nauk

SISÄLTÖ

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5.1. Moduuli 5, Oppitunti 1

Aihe: Hybridi- ja monimuoto-opetus ja oppiminen

Kesto: 1 tunti (60 minuuttia)

Oppimistavoitteet: Tämän oppitunnin päätteeksi osallistujat:

(1) Ymmärtävät hybridi- ja monimuoto-oppimisen käsitteet,
(2) Tunnistavat eron hybridi- ja muoto-oppimisen välillä,
(3) Osaavat selittää, miksi hybridi- ja monimuoto-oppiminen ovat olennainen osa nykypäivän koulutusta,
(4) Osaavat antaa esimerkkejä hybridi- ja monimuoto-oppimisen menetelmien käytöstä luokkahuoneessa.

Opetusmenetelmät/tekniikat:

(1) Esitys PowerPointilla

(2) Yksilötyö

(3) Keskustelu

(4) Kysymykset ja vastaukset (K&A)

(5) Yhteisöllinen oppiminen

Oppimis-opetusaktiviteetit:

(1) Ennen oppituntia: Opettajat ja tulevat opettajat (osallistujat) lukevat tarvittavat taustatiedot hybridistä ja monimuoto-opetuksesta ennen oppituntia. He viittaavat myös verkkoresursseihin syvällisemmän ymmärtämisen saamiseksi. Heitä kutsutaan myös lukemaan hankkeen taustajulkaisun, "Knowledge paperin", viides luku saadakseen perehtymisen tämän moduulin sisältöön.

(2) Oppitunnin aikana:

a) Oppitunnin alussa opettaja aloittaa lämmittelyllä. Osallistujilla on mahdollisuus tutustua toisiinsa paremmin. Sitten muutamia avoimia kysymyksiä esitetään sekä osallistujien

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alustavan tiedon ja ymmärryksen testaamiseksi että henkilökohtaisen kokemuksensa diagnosointiin (esim. Mikä on hybridioppiminen? Mikä on eriä hybridin ja monimuoto-oppimisen välillä? Oletko koskaan osallistunut hybridikursseille/ monimuotokursseille?). Tätä varten käytetään Mentimeteriä tai vastaavaa työkalua. Opettaja jakaa Mentimeter-linkin tai QR-koodin päästääkseen opiskelijat yhteiselle taululle. Näytön on myös jaettava kaikkien nähdäkseen vastaukset reaaliajassa. Tähän menee noin 20 minuuttia.

b) Opettaja esittää teoreettisen taustan ja selittää monimuoto- ja hybridiohjelmien käsitteet. Erityisesti opettaja linkittää nämä oppimismenetelmät digipedagogiaan. Tämä kestää noin 15 minuuttia.

c) Tämän jälkeen osallistujat jaetaan pienempiin ryhmiin opiskelijoiden määrästä riippuen (enintään 4 henkilöä per ryhmä). Heidän tehtävänään on keskustella:

- hybridin/ monimuoto-oppimisen hyödyistä ja haitoista
- haasteista
- mahdollisista tulevaisuuden kehitysnäkymistä näille oppimisen muodoille

d) Yhteenveto: opiskelijat esittävät keskustelunsa tulokset luokan edessä. Opettaja seuraa huolellisesti ryhmäkeskusteluja, vastaa oppilaiden kysymyksiin ja antaa tarvittavaa palautetta. Tähän menee noin 15 minuuttia.

Arviointityökalut:

(1) Vertaisarviointi on tarpeellista selvittääkseen, miten ryhmät opiskelevat.

(2) Itsearviointi on tarpeen oman edistyksen yksilöllisen arvioinnin selvittämiseksi.

(3) Rubriikkia käytetään suunniteltujen toimintojen arvioimiseen.

Teoreettinen tausta (englanniksi)

Blended and hybrid learning are one of the most recent concepts in teaching and learning processes. Global pandemic of COVID-19 forced teachers, trainers and students all over the world and at each stage of education to use online learning in everyday living, even if they didn't use it before. Concepts of hybrid and blended learning are often mixed

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up. After all, both styles of teaching integrate traditional learning styles with technology which brings the advantages of flexibility, accessibility, and scalability.

Hybrid learning is an educational approach where some participants take part in person and some participate online. Instructors and facilitators teach remote and in-person learners at the same time using technology like video conferencing. In the hybrid model, trainees can choose to physically attend the classes or follow them on screen from anywhere they want.

Blended learning is a split model between online classes and actual classes: it is and-and. In **blended learning**, instructors and facilitators merge in-person learning activities with online ones. Learners complete some components in person and do others online. Blended learning is a form of education that combines traditional classroom teaching with online learning experiences. It is also known as hybrid learning or mixed-mode learning. In blended learning, students engage in both face-to-face and online activities to achieve their learning goals. Blended learning can take many different forms, depending on the specific needs and goals of the learners and instructors. Some common examples of blended learning include:

- Flipped classroom: In this model, students watch lectures or complete readings online outside of class, freeing up class time for interactive activities and discussion.
- Station rotation: Students move between different learning stations, which may include online modules, teacher-led activities, group work, and independent study.
- Flex model: Students work independently on online modules and meet with teachers for personalized instruction and support.
- Online lab: Students complete most of their coursework online, but come to a physical lab or classroom for hands-on activities or assessments.

Blended learning offers many potential benefits, including increased flexibility, personalized learning opportunities, and improved engagement and motivation. However, it also requires careful planning and preparation, as well as ongoing monitoring and evaluation to ensure that it is meeting the needs of both students and teachers.

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Lähteet

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5.2. Moduuli 5, Oppitunti 2

Aihe: Virtuaaliluokkien hallinta monimuoto-opetuksessa

Kesto: 1 tunti (60 minuuttia)

Oppimistavoitteet: Tämän oppitunnin päätteeksi osallistujat:
(1) Tunnista menetelmiä ja tapoja, joilla teknologia voi tukea oppimisprosessia.
(2) Keskustele parhaista tekniikoista virtuaaliluokan hallitsemiseksi.
(3) Säädä tarjoamaansa oppimissisältöä yhdistetyn moduulin mukaiseksi.

Opetusmenetelmät/tekniikat:

(1) Ryhmäkeskustelut,

(2) Yksilötyö,

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(3) Kysymykset ja vastaukset osallistujien kesken,

(4) Kysymykset ja vastaukset opettajan ja osallistujien kesken.

Oppimis-opetusaktiviteetit:

(1) Ennen oppituntia: Osallistujat lukevat ensin taustatietoa virtuaaliluokkien hallinnasta. Lisäksi heitä kannustetaan käyttämään online-tietokantoja menetelmien ja työkalujen tunnistamiseen, jotka soveltuvat käytettäväksi monimuoto-opetuksessa. Luennoitsija antaa ohjeet siitä, miten resursseja voi etsiä verkosta.

(2) Oppitunnin aikana:

a) Videoluento (15 minuuttia) menetelmistä ja tekniikoista virtuaaliluokkien hallitsemiseksi keskittyen käytännön näkökohtiin - miten valita työkalu, joka sopii ryhmälle, miten sovittaa materiaali yhteen ryhmäkeskustelun ja opettajan ja osallistujien välisten kysymysten ja vastausten kanssa

b) Yksilötyö (45 minuuttia) - osallistujat tekevät tutkimusta ja kirjoittavat pohdintapaperin liittyen työkalujen ja menetelmien valintaprosesseihin sekä virtuaaliluokalle soveltuvien materiaalien luomiseen/kehittämiseen.

Arviointityökalut:

1. Kysymykset ja vastaukset (K&A): Tämän oppitunnin ensisijainen arviointityökalu on kysymys- ja vastaussessio opiskelijoiden kesken sekä opettajan ja osallistujien välillä.
2.Esseen kirjoittaminen

Teoreettinen tausta (englanniksi)

When people are on their devices, there's a huge temptation for them to turn their attention elsewhere, also at home or in the workplace there are any number of distractions there simply wouldn't be in a physical classroom. It's crucial to maintain student engagement, motivation, attention, and interest in the course or class. Choosing online learning engagement strategies and proper management of virtual classrooms are potentially defining factors in the success of blended courses. There's a wide range of technics teachers can use to gather student attention.

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Managing virtual classrooms in blended education requires careful planning, effective communication, and the use of appropriate technology. Here are some tips for managing virtual classrooms in blended education:

- Establish clear expectations: Communicate clear expectations to your students about how the virtual classroom will operate, what is expected of them, and how they can access resources.
- Use a variety of teaching methods: Use a variety of teaching methods, such as pre-recorded lectures, live video sessions, and interactive activities, to keep students engaged and motivated.
- Create a schedule: Establish a schedule for virtual classroom activities and assignments to help students stay on track and manage their time effectively.
- Use technology effectively: Choose appropriate technology tools and platforms to support virtual classroom activities, such as video conferencing software, learning management systems, and collaboration tools.
- Provide support: Provide support to students as they navigate the virtual classroom environment, such as offering office hours or one-on-one virtual meetings.
- Foster communication: Encourage communication and collaboration among students, and provide opportunities for peer-to-peer learning and feedback.
- Assess student learning: Use a variety of assessment methods, such as quizzes, assignments, and group projects, to evaluate student learning and provide feedback.

Overall, managing virtual classrooms in blended education requires a student-centered approach that emphasizes communication, collaboration, and the use of appropriate technology.

Lähteet

Gorp, M.J.V., Boysen, P. (1997). ClassNet: Managing the Virtual Classroom. *International Journal of Educational Telecommunications*, 3(2), 279-291. Association for the Advancement of Computing in Education.

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5.3. Moduuli 5, Oppitunti 3

Aihe: Digitaaliset opetusmenetelmät ja -tekniikat monimuoto-opetuksessa

Kesto: 1 tunti (60 minuuttia)

Oppimistavoitteet: Tämän oppitunnin päätteeksi osallistujat:
(1) Osaavat selittää, miksi oikeiden digitaalisten opetusmenetelmien ja -tekniikoiden käyttäminen on avain menestykseen monimuoto-opetuksessa.
(2) Osaavat keskustella vaikeuksista digitaalisten opetusmenetelmien toteuttamisessa.
(3) Osaavat antaa joitakin avainesimerkkejä siitä, miten toteuttaa joitakin digitaalisia opetusmenetelmiä ja -tekniikoita.

Opetusmenetelmät/tekniikat:

(1) Ryhmäkeskustelut,

(2) Parityöskentely,

(3) Kysymykset ja vastaukset osallistujien kesken,

(4) Kysymykset ja vastaukset opettajan ja osallistujien kesken.

Oppimis-opetusaktiviteetit:

(1) Ennen oppituntia: Osallistujat lukevat ensin taustatiedot digitaalisista opetusmenetelmistä ja -tekniikoista. Lisäksi heitä kannustetaan käyttämään online-tietokantoja tunnistaakseen menetelmiä ja työkaluja, jotka sopivat käytettäväksi yhdistetyissä luokissa. Luennoitsija antaa ohjeet siitä, miten resursseja voi etsiä verkosta.

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(2) Oppitunnin aikana: Opiskelijat jaetaan kahteen ryhmään. Ensimmäisen ryhmän tehtävänä on kerätä mahdollisimman paljon etuja oikeiden digitaalisten opetusmenetelmien ja -tekniikoiden käytöstä monimuoto-opetuksessa sekä esimerkkejä menetelmistä, jotka ovat ratkaisevan tärkeitä menestykselle monimouto-opetuksessa. Toisen ryhmän tehtävänä on tunnistaa digitaalisesta opetuksesta aiheutuvat ongelmat/ vaarat. Opiskelijoilla on 30 minuuttia valmistautua vastauksiinsa. Sitten kullakin ryhmällä on 10 minuuttia esittelyyn. Jokaisen ryhmän jäsenen on lisättävä jotain keskusteluun. Tavoitteena on vakuuttaa muut omalle näkökulmalleen. Lopuksi arvioijalta saadaan 10 minuutin palautteet.

(3) Oppitunnin jälkeen: Opiskelijat valmistavat esseensä ja esittävät oman näkemyksensä. Ovatko he samaa mieltä ryhmäkeskustelun tulosten kanssa? Miksi? Miksi ei?

Arviointityökalut:

(1) Kysymykset ja vastaukset (K&A): Tämän oppitunnin ensisijainen arviointityökalu ovat opiskelijoiden esittämät kysymykset ja vastaukset opettajan ja osallistujien välillä.

(2) Essee: Essee-tehtävä antaa palautetta opettajalle päätöksenteon tueksi siitä, miten hyvin osallistujat saavuttavat oppitunnin alussa luetellut tavoitteet.

Teoreettinen tausta (englanniksi)

Teachers can use various digital strategies and features already designed in a software: raising their virtual hand, chat box group conversations etc. For example, Zoom has a feature called breakout rooms where the teacher can arrange a separate virtual room for smaller discussion for two or more students. After a certain period of time they return back to the main Zoom room. This is a really great tool to use for conversations, small group discussion and cognitive work of the lesson. Google classroom is a virtual learning environment (VLEE) that can be found in Google Workspace for Education.
Examples of digital teaching methods and techniques that can be used in blended education:

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Learning Management Systems (LMS): An LMS is a digital platform that allows teachers to create and deliver online courses. LMSs can be used to host course materials, assignments, quizzes, and discussions.

Gamification: Gamification involves using game elements, such as points, badges, and leaderboards, to make learning more engaging and motivating. This can be used in both online and offline activities.

Multimedia Content: Multimedia content, such as videos, animations, and infographics, can be used to present complex concepts in a more accessible and engaging way.

Interactive Whiteboards: Interactive whiteboards allow teachers to display and manipulate digital content, such as presentations, videos, and interactive activities.

Flipped Classroom: In a flipped classroom, students watch recorded lectures or other content before class, and then use class time to apply and discuss what they've learned. This allows for more personalized and interactive learning experiences.

Collaborative Learning: Online tools, such as discussion forums, wikis, and group projects, can be used to facilitate collaborative learning among students.

Personalized Learning: Digital tools can be used to create personalized learning experiences based on individual student needs and interests.

Adaptive Learning: Adaptive learning involves using data analytics to personalize the learning experience based on student performance and behavior.

Mobile Learning: Mobile learning allows students to access course materials and engage in learning activities at any time and from any location.

Lähteet

Roehl, A., Reddy, S. L., Shannon, G. J. (2013). The flipped classroom: An opportunity to engage millennial students through active learning strategies.

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5.4. Module 5, Lesson 4

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Aihe: Opettajan pedagoginen ja digitaalinen osaaminen monimuoto-opetuksessa

Kesto: 1 tunti (60 minuuttia)

Oppimistavoitteet: Tämän oppitunnin päätteeksi osallistujat:
(1) Selitä, miksi opettajien on jatkuvasti kehitettävä osaamistaan.
(2) Listaa tavat, joilla opettajat voivat kehittää pedagogista ja digitaalista osaamistaan.

Opetusmenetelmät/tekniikat:

(1) Ryhmäkeskustelut,

(2) Parityöskentely,

(3) Kysymykset ja vastaukset osallistujien kesken,

(4) Kysymykset ja vastaukset opettajan ja osallistujien kesken.

Oppimis-opetusaktiviteetit:

(1) Ennen oppituntia: Jokainen opiskelija valmistelee listan 10 opettajan pedagogisista ja digitaalisista osaamisalueista, jotka he pitävät tärkeimpinä 2000-luvulla.

(2) Oppitunnin aikana: Opettaja kannustaa keskustelua osallistujien kesken:

- Miksi opettajien on jatkuvasti kehitettävä osaamistaan
- Mitä osaamisalueita jokaisen opettajan tulisi kehittää
- Miten opettajat voivat kehittää pedagogista ja digitaalista osaamistaan

Arviointityökalut:

(1) Kysymykset ja vastaukset (K&A): Tämän oppitunnin ensisijainen arviointityökalu ovat opiskelijoiden kesken ja opettajan sekä osallistujien välillä käytävät kysymykset ja vastaukset.

Teoreettinen tausta (englanniksi)

Teachers need to constantly develop their competence to keeping up with changing times: the world is constantly evolving, and so are teaching methods, technologies, and student needs. Teachers must stay up-to-date with new developments in their field to

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provide students with the best possible education and meet their changing needs. Also improving teaching quality is important: as teachers develop new skills and knowledge, they can apply it to their teaching methods and improve the quality of education they provide. This can lead to better student outcomes, higher engagement, and improved learning experiences. Most of educational institutions require their teachers to meet certain accreditation standards. Continuing professional development can help teachers meet these standards and ensure they remain up-to-date with the latest teaching practices. Developing the competences is also important for teachers themselves- professional and personal grow affects greater job satisfaction and fulfillment. The Innovation and Technology Committee of the American Association of Colleges of Teacher Education (AACTE) published in 2008 the *Handbook of Technological Pedagogical Content Knowledge (TPCK).* It defined technology as "tools for acquisition of knowledge that allowed teachers and learners to seek answers to questions, solve problems, and communicate ideas." The AACTE committee allege that, in a world that is rapidly changing through global technologies, educators need to adopt technology as a tool to discover content and knowledge through effective pedagogy and practice or TPCK (later renamed TPACK). National Educational Technology Standards for Teachers, the International Society for Technology in Education (ISTE) standards presented a challenge to higher education to prepare "effective teachers [who] model and apply the [following standards] as they design, implement and assess learning experiences to engage students and improve learning; enrich professional practice; and provide positive models for students, colleagues and community" [1]

The role of the teacher is to

• Facilitate and inspire student learning and creativity;
• Design and develop digital-age learning experiences and assessments;
• Model digital age work and learning;
• Promote and model digital citizenship and responsibility; and
• Engage in professional growth and leadership.[2]

[1] International Society for Technology in Education (Ed.). (2008). *National educational technology standards for teachers (NETS-T) and performance indicators.*
[2] Ibidem

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Lähteet

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e-teach
Upskilling Digital Pedagogy

Moduuli 6
Uudet teknologiat ja sovellukset digitaalisessa pedagogiikassa

BETI

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MODUULI 6 UUDET TEKNOLOGIAT JA SOVELLUKSET DIGITAALISESSA PEDAGOGIIKASSA

Greta Volodzkaitė & Danguole Rutkauskiene, BETI

SISÄLTÖ

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6.1. Moduuli 6, Oppitunti 1

Oppimisprosessin organisointi ja hallinta virtuaalisissa oppimisympäristöissä

Aihe: Oppimisprosessin hallinta oppimisenhallintajärjestelmässä (LMS)

Kesto: 2,5 tuntia

Oppimistavoitteet: Tämän oppitunnin päätteeksi osallistujat osaavat:

- Keskustella LMS:stä ja Moodlestä yleisesti
- Ymmärtää LMS:n hyödyt ja toiminnot
- Luoda oppitunnin Moodlen oppimisympäristössä

Opetusmenetelmät/tekniikat:

Keskustelu, tekemällä oppiminen

Oppimis-opetusaktiviteetit:

Ennen oppituntia:

● Opettajien ja tulevien opettajien tulisi lukea " UUDET TEKNOLOGIAT JA SOVELLUKSET DIGITAALISESSA PEDAGOGIIKASSA " -moduulin ensimmäinen luku käsitteiden ymmärtämiseksi.

Oppitunnin aikana:

● Kaikki opettajat ja tulevat opettajat osallistuvat keskusteluun LMS:stä. He antavat esimerkkejä siitä ja jakavat kokemuksiaan LMS:n käytöstä luokillaan. Myöhemmin he jakavat kokemuksiaan työstään Moodlen parissa ja mitä toimintoja he käyttävät. Opettaja toimii keskustelun vetäjänä. "Quizziz"-aktiviteetteja voidaan esitellä, jotta se olisi pelillistettyä ja osallistavaa.

● Opettaja esittää oppitunnin teoreettisen osan. Hän selittää Moodlen toiminnot ja näyttää joitakin käytännön tehtäviä.

Arviointityökalut:

Opiskelijoita pyydetään työskentelemään omatoimisesti ja esittelemään yksi oppitunti Moodlessa. Oppitunnin työstämisessä on käytettävä vähintään 3 ominaisuutta. Lopuksi esitetään luotujen oppituntien esityksiä.

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Ohjeita (englanniksi)

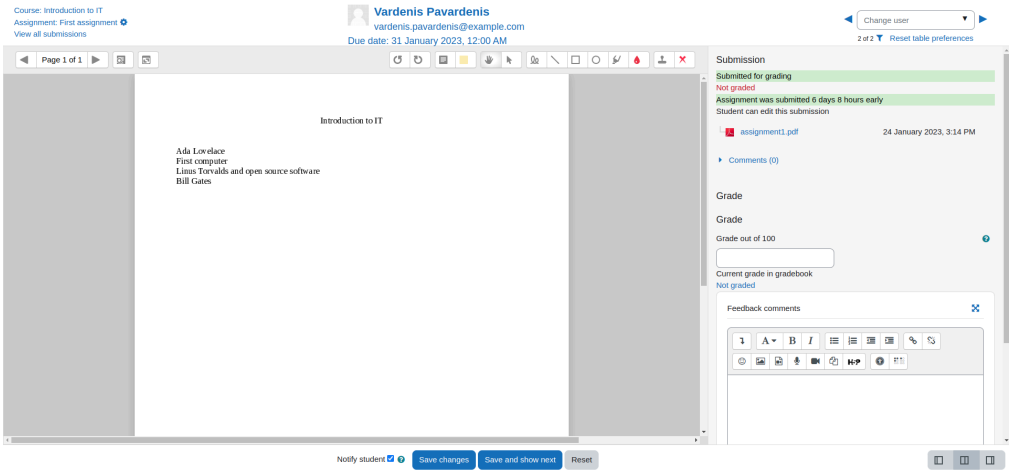
- Assignment activity

Assignments allow students to submit work to their teacher for grading. The work may be text-typed online or uploaded files of any type the teacher's device can read. Grading may be by simple percentages or custom scales, or more complex rubrics may be used. Students may submit as individuals or in groups.

1. In a course, with the editing turned on, choose 'Assignment' from the activity chooser.
2. Give it a name and, in the description explain what the students must submit. You can upload a help or example document from the Additional files area.
3. Expand the other settings to select, for example, availability times, how you want them to submit, and how you plan to give them feedback. (Comment inline allows you to annotate directly on their submitted work.)
4. If you want them to verify they are submitting their own work, or if you want to prevent them from changing their submission once uploaded, explore the Submission settings. To have them submit in groups, explore Group submission settings (ensuring your course has groups)
5. To use a rubric instead of a single grade scale, change the Grading method to Rubric and, once the assignment is saved, create or locate the rubric from the Advanced grading link in the Assignment administration block on the side.

Note: Ask your administrator to check the assignment defaults if you are missing a particular setting.

Once students have submitted work, click on the assignment and click "Grades" The exact view depends on the teacher and admin settings. Here, the submission may be annotated and/or downloaded; a grade entered, and individual feedback given. The teacher saves the changes and moves to the next student.



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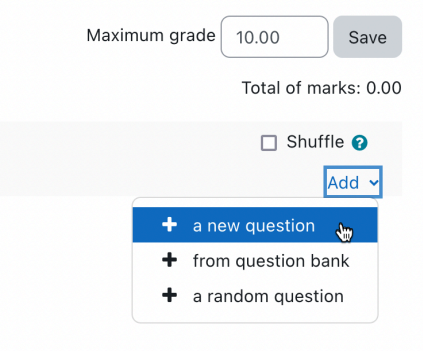
- Quiz activity

The Quiz is a very powerful activity that can meet many teaching needs, from simple, multiple-choice knowledge tests to complex, self-assessment tasks with detailed feedback. Questions are created and stored separately in a Question bank and can be reused in different quizzes. When creating a Quiz, you can either make the questions first and add them to the Quiz or add a Quiz activity and create the questions as you go along.

1. In a course, with the editing turned on, choose Quiz from the activity chooser.
2. Give it a name and, if required, a description.
3. Expand the other sections to select the settings you want. With the default settings, students can repeat the quiz, moving freely between questions, each on a different page. There is no time limit and scores and feedback display once they have completed the quiz.
4. Click Save and display.
5. Click Edit quiz
6. Click Add and then click '+ a new question' (If you already made questions in the question bank, then click '+ from question bank' or if you wish to add a question randomly picked from a category of questions, click '+ a random question'.)



7. Choose the type of question you want to add and then click 'Add' at the bottom:
8. Add your question.
9. Click Save changes and repeat the steps for as many questions as you need.
10. Click 'Save changes' when you have made your question.
11. If you want, change the maximum grade for your quiz to reflect the number of questions.

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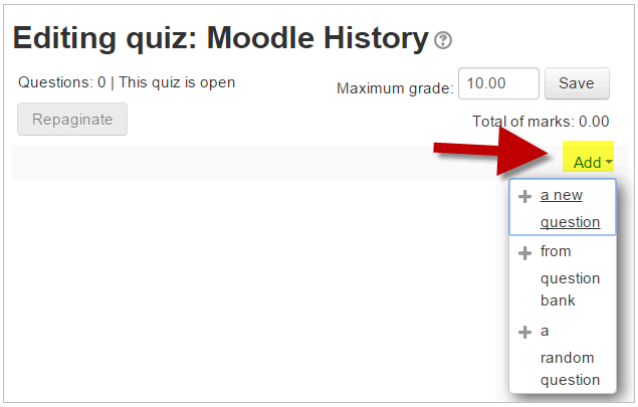
Teachers should preview the quiz to ensure it displays as desired for students. Grades can be viewed either by clicking the quiz and the link 'Attempts' when students have attempted the quiz, or from the Actions menu top right > Results.

- Building Quiz

Once a quiz has been added to the course and the Quiz settings established, the teacher can start to build the quiz. The teacher can access the quiz to edit the questions by clicking directly on the Quiz name on the course home page and clicking the Add question button (You can also make questions in the Question bank without first creating a quiz. These questions may then be used later.)
Once you have accessed the quiz editing screen as above, you can add questions from several locations:

1. Click the 'Add' link as in the screenshot below. (Note that in the US, the term 'marks' is replaced by 'points'.)
2. When it opens up, choose either to add a new question, select a question from the question bank, or add a random question.



3. To make a brand-new question, click 'Add' and then '+ a new question'.
4. From the next screen, choose the question type you want to add and click "Next" ('When you click on a question type on the left, helpful information appears on the right.)

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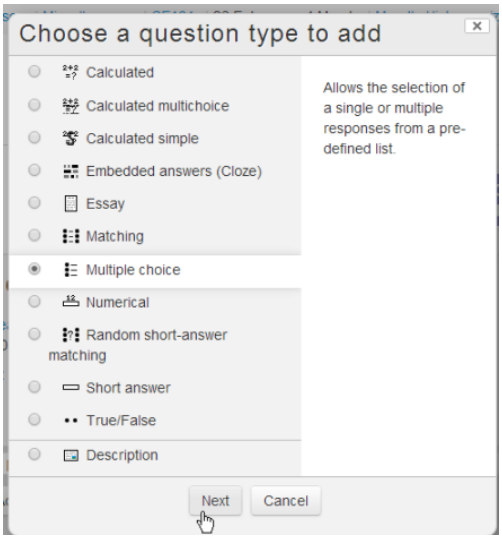
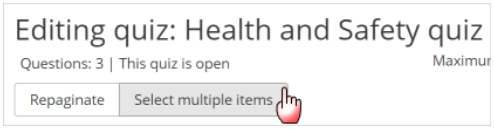


5. Fill in the question form, making sure to give a grade to the correct answer.
6. Click "Save changes".

When a question has been created, an icon and words display its type (e.g. multiple choice). It can be modified by clicking the edit icon (e.g.) and previewed by clicking the magnifying glass icon. As well as deleting individual questions with the delete (bin/trash can) icon, it is possible to delete more than one question by pressing the 'Select multiple items' button and choosing the questions to be removed:



- Workshop activity

Workshop is a powerful peer assessment activity. Students add submissions which are then distributed amongst their peers for assessment based on a grading scale specified by the teacher.

1. In a course, with the editing turned on, choose 'Workshop' from the activity chooser.
2. Give it a name and, if needed, a description
3. Expand the other sections to select the settings you want. If you are not sure, leave everything as default.
4. Grading settings - students receive two grades, one for the work they submit and one for the quality of their peer assessments.
5. Submission settings is where you explain the task they must submit.
6. Assessment settings is where you give a brief outline of how they will assess the work of their peers.

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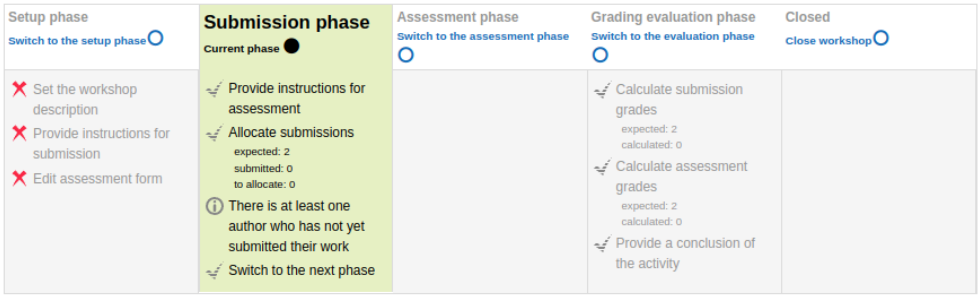
7. Feedback will, if enabled, allow students to add text comments when they review each other's work.
8. Example submissions, if enabled, allows you to provide examples for students to practise with before they begin peer assessing.
9. Availability gives you the option to allow students to start peer assessing as soon as the submission deadline is over, rather than you are enabling this manually.
10. Click Save and display and explore the Workshop phases in the section Teacher view, making sure you complete the Set-up phase and switch to the Submission phase when you want your students to begin the activity.

Once a Workshop activity has been created and saved, it is in the Set-up phase. It must be in the Submission phase for students to be able to submit work and then moved to the Assessment phase for them to review each other's submissions. The switch may be automatic or manual.

- Click 'Edit assessment form' to provide detailed grading criteria for your students to use. When finished, click 'Save and close', and all ticks on the Setup phase will be the same color.
- You are ready to switch to the Submission phase which lets students send in their work. Click the icon or text at the top of Submission phase. This phase will be highlighted.
- Students will now be able to submit their work during this time, until any deadline you specified - unless you also allowed late submissions.
- Click the link 'Allocate submissions' to decide if you yourself want to choose which student assesses whose work (Manual allocation), or if you want Moodle to choose for you (Random allocation) And do you want students to assess others' work even if they have not submitted anything themselves?
- If, in the Availability section you set the workshop to switch to the submission phase automatically once the submission deadline is over, choose Scheduled allocation.



You can see how many have submitted and how many still need to submit. Click the icon or text to move to the Assessment phase if you chose to switch phases yourself. The phase will be highlighted. (Remember that you can move back a phase if you need to, for

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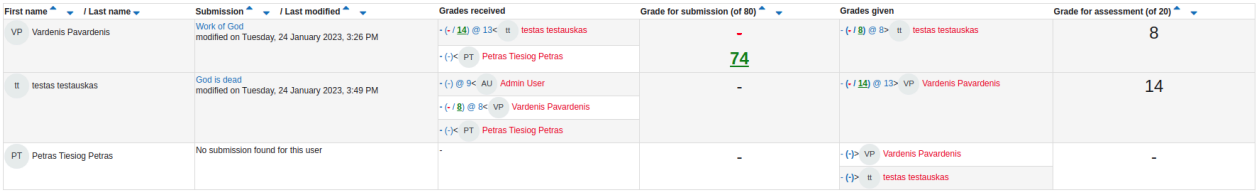
example if you want to allow a student to resubmit.) Students will assess the work of their peers according to the instructions and criteria you gave them. You can monitor their progress by looking at the grades underneath the phases screen:



First name / Last name	Submission / Last modified	Grades received	Grade for submission (of 80)	Grades given	Grade for assessment (of 20)
VP Vardenis Pavardenis	Work of God modified on Tuesday, 24 January 2023, 3:26 PM	- (- / 14) @ 13< tt testas testauskas - (-)< PT Petras Tiesiog Petras	- 74	- (- / 8) @ 8> tt testas testauskas	8
tt testas testauskas	God is dead modified on Tuesday, 24 January 2023, 3:49 PM	- (-) @ 9< AU Admin User - (- / 8) @ 8< VP Vardenis Pavardenis - (-)< PT Petras Tiesiog Petras	-	- (- / 14) @ 13> VP Vardenis Pavardenis	14
PT Petras Tiesiog Petras	No submission found for this user	-	-	- (-)> VP Vardenis Pavardenis - (-)> tt testas testauskas	-

When you are ready, click the icon or text to move to the Grading evaluation phase. This phase will be highlighted. Here, Moodle calculates the final grades for submission and for assessment.

- For the grade for assessment, you can decide how strict you want the comparison to be. If you are not sure, leave it as the default 'fair'.
- You can recalculate the grades several times.
- You can change grades here if you need to.
- You can show to other students selected submissions if you wish. Click on a submission in the workshop grades report (image above) and scroll down to 'Feedback for the author'. Tick the box to publish this submission. Other students will see it once the workshop is closed.
- When you are satisfied with the final grading, click the icon or text to close the workshop. The Closed phase will be highlighted and students will be able to see their grades, any published submissions and a conclusion if you added one.

- BigBlueButton

BigBlueButton lets you create from within Moodle links to real-time on-line classrooms using BigBlueButton, an open-source web conferencing system for distance education. You can specify conference times, which are then added to the calendar, and, if allowed in your installation, the sessions may be recorded for viewing later.

<u>Important- Free Tier Hosting is currently restricted as follows:</u>

- The maximum length for each session is 60 minutes.
- The maximum number of concurrent users per session is 25.
- Recordings expire after seven days and are not downloadable: and
- Viewers' (student) webcams are only visible to the moderator.

<u>Set up and use BigBlueButton</u>

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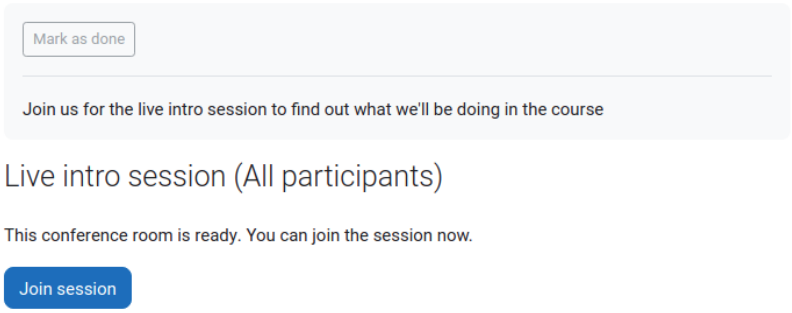
- In a course, with Edit mode enabled, choose, BigBlueButton from the activity chooser.
- Choose a name and description, and, if desired, a welcome message which will appear in the Chat box when participants join the session.
- If you tick "wait for moderator", students can only join once someone with the moderator role has entered the room.
- From the Participants list you can, if needed, give specific roles to specific people, such as a moderator role.
- If enabled by the administrator from Site administration > Plugins >Activity modules> BigBlueButton> Experimental settings, a new section, Guest access, becomes available to course teachers.

Once set up, the activity appears with a link to join when the time is correct. (Before then, or if a moderator is required first. a message appears saying the conference has not yet started.)



On entering the room, a message will appear asking if you want to use your microphone or just listen. If you choose microphone you will need to check your settings. The moderator can choose whether to allow participants to use webcams and microphones or not. The central area can display presentations, polls, screensharing or an interactive whiteboard. There is also a chat option with public and private chat. Like ZOOM, isn't it?

- Survey activity

The Survey activity offers a number of verified survey instruments, including COLLES (Constructivist On-Line Learning Environment Survey) and ATTLS (Attitudes to Thinking and Learning Survey), which have been found useful in assessing and stimulating learning in online environments. Teachers can use these to gather data from their students that will help them learn about their class and reflect on their own teaching. Note that the Survey is not customisable; if you want to create your own survey questions, then explore the Feedback activity.

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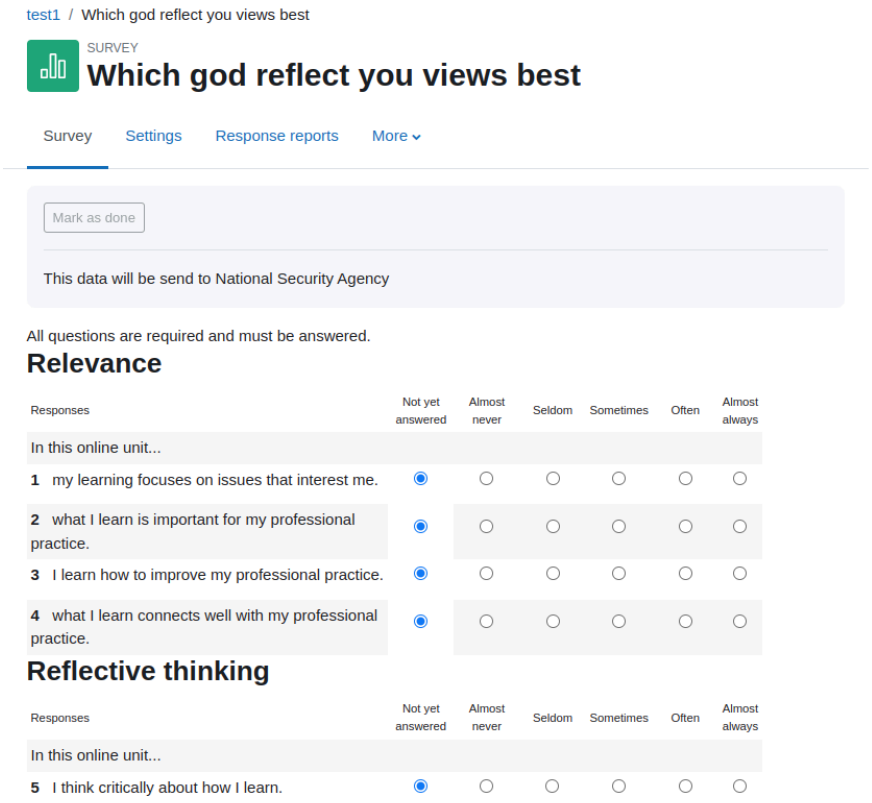
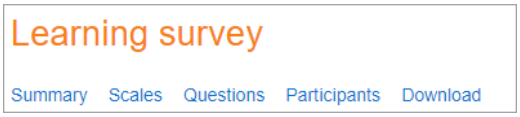


- In a course, with the editing turned on, choose 'Survey' from the activity chooser.
- Give it a name and, from the dropdown, choose your Survey type. Click the question mark '?' icon for information about each Survey type.
- Add a description if required.
- Expand the other sections to select the settings you need.
- Click Save and return to course.

When teachers click the Survey icon, they can view results by clicking the link 'View ... survey responses' or by clicking Response reports from the gear icon Action menu. They have a few tabs providing different data.



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6.2. Moduuli 6, Oppitunti 2

Aihe: Hybridioppimisen ja -opetuksen teknologiat

Kesto: 2,5 tuntia

Oppimistavoitteet: Tämän oppitunnin päätteeksi osallistujat:

- ymmärtävät mitä on hybridioppiminen
- oppivat teknologioista, joita käytetään hybridiopetuksessa
- hallitsevat ja käyttävät kahta työkalua

Opetusmenetelmät/tekniikat:

Keskusteltu, tekemällä oppiminen

Oppimis-opetusaktiviteetit:

Ennen oppituntia:

● Opettajien ja tulevien opettajien tulisi lukea "UUDET TEKNOLOGIAT JA SOVELLUKSET DIGITAALISESSA PEDAGOGIIKASSA" -moduulin toinen luku käsitteiden ymmärtämiseksi.

Oppitunnin aikana:

● Kaikki opettajat ja tulevat opettajat osallistuvat keskusteluun hybridioppimisesta. Mitkä ovat sen hyödyt? Mitkä ovat puolet ja vastapuolet? Miten he ovat yrittäneet toteuttaa hybridiopetusta? Mitä sovelluksia he tuntevat hybridiopetusluokkia varten? "Quizziz"-aktiviteetteja voidaan esitellä, jotta se olisi pelillistettyä ja osallistavaa.

● Opettaja esittelee oppitunnin teoreettisen osan - työkalut ja niiden löytäminen, samoin kuin tärkeimmät ominaisuudet.

Arviointityökalut:

Opiskelijoita pyydetään työskentelemään omatoimisesti, tutustumaan työkaluihin ja kokeilemaan vähintään kahta niistä. Heitä pyydetään luomaan jotain luokkaansa näillä työkaluilla ja esittelemään se kaikille.

Ohjeita (englanniksi)

Access here: ***https://whiteboard.fi/***

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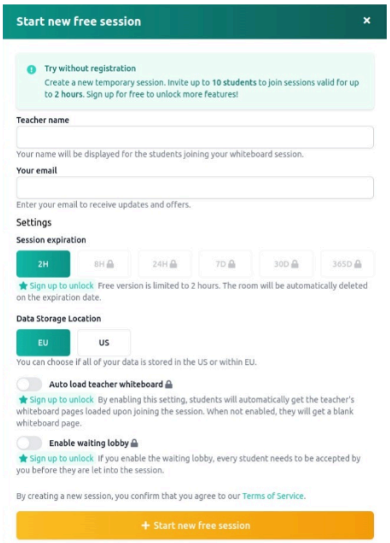
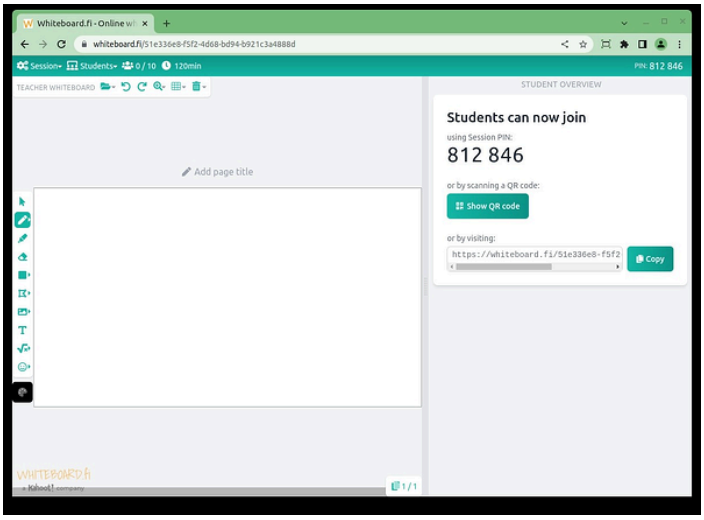
Whiteboard.fi is a simple tool that can be used instantly. Create a class and let your students join, using a link, room code or QR code. Everyone will get an individual digital whiteboard, where they can draw, write text, make notations on images, add math equations, and more! Starting a new session on Whiteboard.fi is fast and easy. To start a new session - click *on New session*.



Enter the details into the form and click on *Start new session*. Your class is now ready!



Access here: ***https://info.flip.com/getting-started.html***

Flip is a video discussion app, free from Microsoft, where curious minds connect in safe, small groups to share videos, build community, and learn together. Here are some ways to use it:

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- Sharing book reviews: With Flipgrid's new augmented reality (AR) feature, classrooms and classroom libraries can use the video QR code to create an engaging way for students to share book reviews. After a student record their review, the teacher can print the QR code and tape it on the book, and the student's classmates can use their devices to scan the code and watch the review as a way to help them decide if they'd like to read the book.
- Practicing world language skills: Flipgrid makes it possible for teachers in different districts and different countries to collaborate. For world language teachers, this creates opportunities for students to practice their speaking skills with a larger group than just their class. Students can post videos to get practice with the vocabulary they're learning, and instead of being limited to practicing with the people in their physical classroom, they can engage and build their skills with other students around the world studying the same language or have conversations with native speakers of the language.
- Increasing accessibility for all students: Flipgrid has expanded many of its accessibility features to ensure that all students can participate. Students can use closed captioning when viewing videos, which also generates a full transcript for each video. Microsoft's Immersive Reader can be used within both the closed captioning and any text within a topic to read the texts aloud and break up words into syllables for easier decoding.
- Inviting outside speakers: Using Guest Mode, teachers can invite guest speakers to participate in classroom discussions. Guests can watch student videos and post their own videos. This option provides a way for experts in a field to share their knowledge asynchronously, with students posting videos of their questions for the expert to answer at a convenient time in a video response. STEM teachers, for example, could invite engineers or scientists to discuss their careers and research and to answer student questions.
- Building student portfolios: A teacher can create a grid for student portfolios. Within this grid, the teacher creates a topic for each student, and students post videos explaining their work, demonstrating a recently learned skill, or reflecting on an in-class experience. The teacher can share the link to a student's topic with their parents or guardians so they can view their child's work throughout the year. Since the topics can also be available to every student in the class, students can observe their classmates' work.
- Adding annotations: When students record a video, they have the option to write directly on the video, and they can add sticky notes with additional text. For students in math practicing solving problems or students in chemistry learning to balance chemical equations, this feature is a great way to show their thinking.
- Building a mixtape: The mixtape is a way to curate videos from any topic or grid in a single location. A teacher can select any student video and add it to the mixtape,

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which can be shared with the entire class. Collecting memories from throughout the year is a great way to take advantage of the feature: As the year progresses, the teacher can save interesting videos or important moments from different topics. Watching the mixtape as a class at the end of the year will help students recall what they've learned.

- Sharing and celebrating work: Celebrating completed projects or finished assignments is often forgotten in the classroom due to time constraints, but Flipgrid makes it fairly easy and quick. Using the student-to-student replies option, everyone in the class can view and respond to each other's videos. For example, students in a history class could share a long-term project they have completed, walking through what they learned and what they created. Peers in the class compose video responses, providing positive feedback on the work completed.
- Supporting absent students: Flipgrid can be a catch-up solution for students who are absent. The teacher creates a topic for work completed in class, and if a student is absent during a given class period, one of their peers can post a quick video about what assignments were completed in class so the absent students can quickly learn about what they missed.

Access here: ***https://padlet.com/***

Padlet is a free online tool that is best described as an online notice board. Padlet can be used by students and teachers to post notes on a common page. The notes posted by teachers and students can contain links, videos, images, and document files. When you register with Padlet, you can create as many "walls" or online notice boards as you like. These walls can set to private or public, with each wall having separate privacy settings. This can facilitate teacher collaboration in a subject department, which is not accessible by students. Private walls can be created by requiring a password to access them, or by limiting access to registered users, with specified emails. As the creator of a wall, teachers can moderate all notes before they appear, and privacy settings can be adjusted at any time. Users do not need to sign up to use Padlet, though it is recommended that teachers using it in a classroom setting would do so, to edit a wall, moderate posts and collate all class walls into one management screen. Teachers can also choose to set a notification to receive an email whenever a student posts to the teacher's wall.

Access here: ***https://www.peardeck.com/pricing***

Pear Deck is an interactive lesson platform designed to easily integrate with the classroom tools you already use and built to supercharge student learning. With Pear Deck, you have the option of running a lesson in Instructor-Paced or Student-Paced Mode. The mode can be changed at any time during a lesson based on the instructional needs of the slide, regardless of the mode in which it was started. From the pop-up

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window, select a Student-Paced or Instructor-Paced Activity. Remember, you can change this setting at any time during your lesson.

Student-Paced for Asynchronous Instruction. Pear Deck Student-Paced Mode allows you to get all the power of Pear Deck engagement even when students are working through lessons at their own pace. Use any of your existing lessons with Pear Deck interactivity, launch your presentation in Pear Deck, and then turn on Student-Paced Mode!

Instructor-Paced for Synchronous Instruction. The most traditional use of Pear Deck is for whole class instructor-paced sessions. In these sessions, all students will be on the same slide at the same time. The teacher controls the pace of the lesson and progression of slides. Just because we are operating in a virtual environment doesn't mean this model can't be used. Synchronous, instructor-paced sessions can still be conducted virtually using Pear Deck. To be successful, this requires teachers and students to set-up their screens to mirror what would be present in the physical classroom setting

Access here: ***https://www.kamiapp.com/pricing/***

Kami is a Google Chrome extension that allows you to digitally edit documents from your PC. Kami is available on the drop down through Google Drive, but you can also add it to Chrome by following this link.

https://chrome.google.com/webstore/detail/kami-for-google-chrome/ecnphlgnajanjnkcmbpancdjoidceilk?hl=en

*You will need to be using the Google Chrome browser to be able to use Kami. Follow the link, then Click 'Add to Chrome and Click 'Add extension'.

Using Kami to annotate

1. Open the document you want to digitally annotate and download it.
2. Click the Kami shortcut in your pinned extension bar.
3. Create a Kami account or use 'Sign in with Google' if you have a Google account.
4. Click 'Open from Computer'.
5. Locate the document and double click to open it.
6. If required, convert the document.

The toolbar should be used the way it is shown below:

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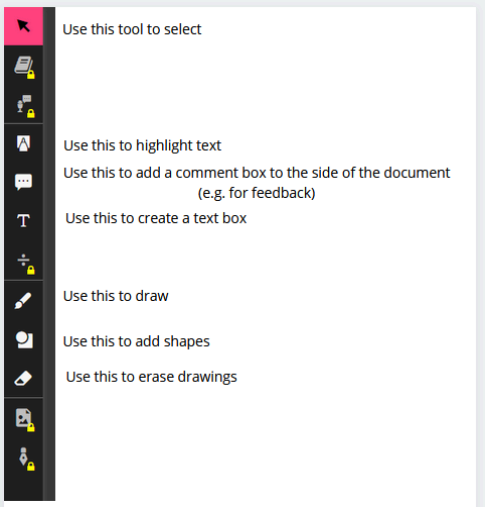

Exporting Kami files

When you're happy with the document, click the download icon  (Highlighted in yellow)
2. Click 'Begin export'
3. The file with now download, with annotations, as a PDF document which you can then upload to the submission point.

*Access here: **https://www.mote.com/***

Mote is a FREE Chrome extension that allows you to leave voice notes and feedback, and much more. Mote allows you to talk more and type less. If you haven't explored all the features of Mote, now is the time! Teachers need to have it installed. Students do not have to have it installed, but it works more seamlessly if they do have it.

- Voice Comments and Feedback. With one click of a button, you can record audio feedback for students and leave it as a comment in your favorite Google applications or Google Classroom. You can also record any time using the Chrome browser and paste the link wherever you need it to go–Canvas, Schoology, etc.
- Emojis. Not only can you insert voice comments with transcription, but you can also insert emoji!
- Support ELL Students and Improve Accessibility. Using the translation feature is a great way to support English Language Learners. Record and translate into the student's first language. So, they can hear it in the language they are learning and see the translation to reinforce the meaning. Foreign language teachers will also love this feature for helping students learn a new language.

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- Google Classroom Comments & Instructions. Once installed, you will see the Mote icon inside Google Classroom posts. Add voice instructions to your assignments, leave voice comments, voice announcements, or use them in the grading workflow
- Choose Your Own Adventure Stories in Slides. You can use Google Slides for students to create their own “Choose Your Own Adventure” style stories. By linking slide to slide, the stories can have different options. Then, they use Mote to add narration to their stories.
- Student Reflections. You can get your students take a photo of their work, insert it into Slides, then record a reflection using Mote.
- Improve Reading Fluency. Students can improve their reading fluency by using Mote to record themselves reading and listen to it.
- Demonstrate Learning. Consider the many ways students can add a mote audio recording to explain their answers and demonstrate their learning.
- Exit Tickets. You can also use Google Slides and Mote for exit tickets. Teachers like to use “Two Stars and a Wish” to guide students through their exit tickets for the day. On the slide, they insert their mote recording to share their thoughts and questions

Access here: **https://edpuzzle.com/**

EDpuzzle is a teaching tool used to place interactive content into pre-existing videos from a variety of sources, such as TED or YouTube, or into videos you have made.

- Create an Account To create an EDpuzzle account, navigate to EDpuzzle .com .
- Click on the “Teacher Start Now” button. A new page will load with a brief introduction.
- Click on the “Start tour” button to begin a brief walkthrough of how to trim and add a question to a video.
- Follow along in the tutorial, clicking on the “Continue” button when finished with each page. On the last page, click on “Create my first lesson” to make an account.
- Click on “Google” and sign in with your PLU ePass username and password. A window will appear asking for permission to use the account; click the “Allow” button to create the EDpuzzle account.
- To create an account without using a PLU email, fill out the information in the form as appropriate and click “Sign up.”
- Make a Lesson To annotate and add questions to a new video, click on “Search” at the top of the screen.

Videos can be: searched by typing text into the search bar; Added via URL by typing or pasting it in the search bar; Uploaded from a computer file by clicking the “Upload” button. After selecting a video, click on it and select the “Use it” button.

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Edit Video Content. At any point during the editing process, progress can be saved by clicking on the green “Save” button. When navigating between editing options, EDpuzzle will automatically save the lesson, however it is still a good idea to save often, especially if doing a lot of editing. To navigate between editing options, click on the icons at the top of the screen.

6.3. Moduuli 6, Oppitunti 3

Video-oppitunnit ja digitaalinen sisältö

Aihe: interaktiivisia opetusvideoita

Kesto: 2,5 hours

Oppimistavoitteet: Tämän oppitunnin päätteeksi osallistujat:

- ymmärtävät, miten tehdä laadukas opetusvideo kotona
- oppivat teknologioita, jotka tukevat vuorovaikutteisuutta opetusvideolla
- oppivat integroimaan vuorovaikutteisuutta videoon

Opetusmenetelmät/tekniikat:

Keskustelu, tekemällä oppiminen

Oppimis-opetusaktiviteetit:

Ennen oppituntia:

● Opettajien ja tulevien opettajien tulisi lukea "UUDET TEKNOLOGIAT JA SOVELLUKSET DIGITAALISESSA PEDAGOGIIKASSA" -moduulin kolmas luku käsitteiden ymmärtämiseksi.

Oppitunnin aikana:

● Kaikki opettajat ja tulevat opettajat osallistuvat keskusteluun opetusvideoista. Mitkä ovat sen hyödyt? Ovatko opettajat käyttäneet itseään tallennettuja vuorovaikutteisia videoita? Miksi tai miksi ei? Jos kyllä, mitä työkaluja käytettiin? "Quizziz"-aktiviteetteja voidaan esitellä, jotta se olisi pelillistettyä ja osallistavaa.

● Opettaja esittelee oppitunnin teoreettisen osan. Hän esittelee erilaisia työkaluja, joita voidaan käyttää vuorovaikutteisiin videoihin.

Arviointityökalut:

Opiskelijoita pyydetään työskentelemään omatoimisesti ja tekemään lyhyt video itsestään sekä integroimaan yksi vuorovaikutteinen toiminto sekä lopuksi esittelemään se muulle ryhmälle.

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Työkaluja

Mindstamp

It is a simple tool that makes it easier to build high-converting interactive videos. It allows you to add choice-based clickable images in your clips to create stories or product journeys. With its hotspots and CTA elements, you can label items, tag product details, entertain people with tools and tips, and include educational content. You can also attach short clips or draw anything over your video to make it more fun and engaging. One of its most powerful features you'll particularly find useful is its custom variable. It automatically changes a specific word or sentence to targeted content to offer a personalized experience to your students. You can use this feature in tons of ways, like displaying an actionable sales copy, nurturing leads conversations, or asking questions to collect data.
Mindstamp comes with a feature called insights dashboard. This includes powerful tools to visualize the impact of your interactive videos across engagement, completion, interactions, and geography along with detailed reports on your top videos and top interactions. It's super easy to use and can turn any basic shot into a professional interactive video.

Find it here: https://video.mindstamp.io/register?via=Squeeze

WireWax

It is one of the oldest and widely preferred interactive tools on the market. Its price might be slightly higher than others, but it has some interesting features you'd love. For one, WireWax has an aesthetically pleasing dashboard and user-friendly interface that makes your experience enjoyable. Second, it offers more than one interactive action. You can add static as well as movable hotspots, and include a pause option to stop the video automatically when clicked.
WireWax provides customizable overlay templates to ease your job. It also extends analytics to track your video performance. While WireWax caters mostly to eCommerce businesses for online shopping, you can create how-to videos and educational content.

Find it here: https://vimeo.com/features/interactive-video

Adobe Captivate

It is a product of Adobe Creative Cloud that provides basic interactive video features for beginners. It offers link-embedding, overlays, and bookmarks to transform a linear YouTube video into an interactive one. You can build multiple slides, create a drag-and-drop action, add a choice action, and much more. Adobe Captivate also

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extends remediation actions that allow viewers to go back and change their original choices. Coming to its dashboard, the Adobe Captivate interface resembles a mix of PowerPoint and Adobe Premiere. At the top panel, you'll find the Interactive Video option to embed video and overlays. With this, you can compose your initial slides, add a video, and embed overlays (your slides) to make an interactive video.
Keep in mind Adobe Captivates currently supports HTML5 format. That probably means any video you create would only appear on your mobile and tablets.
Find it here:
https://www.adobe.com/products/captivate.html?clickref=1100lwv4Acwn&mv=affiliate&mv2=pz&as_camptype=&as_channel=affiliate&as_source=partnerize&as_campaign=squeezeadobe

Rapt or Kaltura

It is an online platform that primarily offers the choice-based feature. It comprises adding hotspots to the video to provide multiple choices to the viewers. Besides clickable CTA, Kaltura is compatible with both mobile and laptop and its player supports several networks. With Kaltura player, you can view your interactive video on any platform listed under the publishing option.
To create the interactive video, you may need to log in from Kaltura Management Console to gain access, though. The primary site will lead you to the interactive video path and into the composer. From there, the composer will literally create a path to prepare your video. Meaning, it has a drag-and-drop feature that makes it easy for you to pull multiple media from the template column and connect them together. Once you've built a path, click on the main video, add hotspots, and save it. That's it.
Find it here:
https://corp.kaltura.com/video-content-management-system/kaltura-interactive-video-paths/

ThingLink

It was initially created for annotating images. But over the years, it has extended into one of the popular interactive video platforms. Today, ThingLink is not merely a video editing software. The tool transforms both video and pictures into interactive content.
Anyway, ThingLink offers a tagging feature that helps you build virtual tours, infographics, and marketing. You can also use the same action to create an animated story, tour, user guide, webinars, etc. Merely customize your tags, add fun facts, and take your student on your subject journey. With one tagging function, you can comfortably design a professional video.

Find it here: https://www.thinglink.com/business

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H5P

It is open-source software that allows you to create and share interactive videos on your site and social media. The tool offers plenty of interactive templates and over ten video features. You can include quizzes, add links, labels, and a table of content. It's a powerful platform that provides tons of actions to produce an entertaining video. To use H5P, you can either install a plugin or operate it on the H5P site. You'll find H5P language slightly different, so you may have to navigate the platform to familiarize yourself. But the good news is, the dashboard is fairly simple. Upload your selected content, tag the interactive action you want to display, and embed the content on your site. If you choose to download the plugin, you can directly create the video on WordPress. Otherwise, sign-up to start using HFP.

H5P Key Features:

- Drag-and-drop CTA
- Interactive labels and drop-down menu table
- Clickable quizzes
- Time triggers hotspots
- Pricing

H5P is completely free to use and offers tutorials in its community. Join it now to get access to tons of user videos: https://h5p.org/interactive-video

6.4. Moduuli 6, Oppitunti 4

Lisätty todellisuus (AR), virtuaalinen todellisuus (VR) ja mixed reality (MR) **Subject:**

Aihe: Lisätty todellisuus (AR), virtuaalinen todellisuus (VR) ja mixed reality (MR) luokkahuoneessa

Kesto: 3 tuntia

Oppimistavoitteet: Tämän oppitunnin päätteeksi osallistujat:

- ymmärtävät, miten AR, VR ja MR voivat olla käytössä opetuksessa
- oppivat käyttämään työkaluja oppimissisällön luomiseen AR:ssa
- osaavat luoda objektin AR:n avulla

Opetusmenetelmät/tekniikat:

Keskustelu, tekemällä oppiminen

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Oppimis-opetusaktiviteetit:

Ennen oppituntia:

● Opettajien ja tulevien opettajien tulisi lukea "UUDET TEKNOLOGIAT JA SOVELLUKSET DIGITAALISESSA PEDAGOGIIKASSA" -moduulin viides luku käsitteiden ymmärtämiseksi.

Oppitunnin aikana:

● Kaikki opettajat ja tulevat opettajat osallistuvat keskusteluun laajennetusta, virtuaalisesta ja mixed realitysta luokassa. Ovatko he käyttäneet sitä? Jos eivät, mitkä ovat esteet? Mielestäänkö he, että se on hyödyllistä? Mielestäänkö he, että näiden teknologioiden luominen ja käyttäminen itse on helppoa? "Quizziz"-aktiviteetteja voidaan esitellä, jotta se olisi pelillistettyä ja osallistavaa.

● Opettaja esittelee oppitunnin teoreettisen osan. Hän esittelee erilaisia työkaluja, joita voidaan käyttää AR:n luomiseen.

Arviointityökalut:

Opiskelijoita pyydetään työskentelemään omatoimisesti ja luomaan AR-objekti itse jollain esitellyistä työkaluista sekä esittelemään se muulle ryhmälle.

Taustatietoa ja työkaluesimerkkejä (englanniksi)

Newer augmented reality technology eliminates the trigger image and places objects in your space by surface tracking. In the past four years, this technology is included on most mobile devices and uses ARKit for the Apple platform and ARCore for Android. The ARKit and ARCore technology can adjust the object to fit in the space, change in brightness, layer around people, identify face and hands, plus so much more. The technology is incredible, but it must run on relatively new devices. At this point, more and more classrooms are equipped to run ARKit and ARCore applications, but the use of trigger images is still prevalent for classroom lessons.

Below are a few options that will support your lessons in creating augmented reality. Depending on the classroom resources and preferred outcome, some options may be more beneficial than others.

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https://arize.io/

ARize has very simple interface. The possibility to link a website from the augmented reality experiences is unique. Most AR creation tools require the video content to be loaded onto YouTube, but ARize allows the video to be uploaded to the website.

1. Go to arize.io and select “Get Started Now” to set up an account.
2. Select “Create AR” and then “Tap to Start.”
3. Select the type of AR experience you want to add on top of your trigger image.
4. Upload or add the link to the content on the trigger image and upload the trigger image (JPEG only).
5. Select “Public” with the free version of ARize and “Create Post.”

Cost: Free for up to 10 experiences.
Creation Platform: Web-based
Ease of Use: Easy
Features: Use your videos, 3D objects files, Sketchfab and Google Poly integration, links or Unity projects.

https://studio.arloopa.com/en/auth/login

The Arloopa studio is a simple yet effective and customizable augmented reality experience tool. One of the features in the Arloopa Studio is the option to move the 3D objects exactly where you want it placed in the AR experience. The user can add multiple objects in one AR experience. The option to create AR content using a trigger image, using surface tracking or location services makes the tool more flexible for classrooms.

1. Go to Arloopa studio and select “Create an Account.”
2. Select “Create New Experience.”
3. Pick the type of experience you want to apply, either using a trigger image, placing the experience in the room, or placing at a specific location.
4. Select the type of AR experience you want to add on top of your trigger image.
5. Paste the link or upload the image/video/object to layer on top and upload the trigger image.
6. After customizing the experience, select “Publish.”

Cost: Free for up to 10 experiences
Creation Platform: Web-based
Ease of Use: Easy
Features: Use your videos or link from YouTube, upload 3D object files or link from Sketchfab and Google Poly, add links to a website, Unity projects

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https://assemblrworld.com/studio

The Assemblr Studio is an app that you download onto your computer. The 3D library is notable with animated objects and many educational items to include in your class. The platform is simple to use, and it allows more personalization than many of the other tools. The free options are acceptable for many classrooms, and the cost to upload a customized trigger image (also called marker) is affordable.

1. Go to Assemblr Studio and download the software onto your computer.
2. Select “Create New Project” and give your project a name.
3. Add the 3D objects, pictures, or videos you want to include in your experience.
4. Place and modify the items on the marker area to customize the experience.
5. Select “Publish” and download the marker to view your experience.

Cost: Free with the QR code
Creation Platform: Download application on a computer
Ease of Use: Easy with added optional
Features: Use your images or videos, a large and animated 3D object library, 3D objects can be uploaded with a subscription (otherwise 8 MB is the file limit)

http://creator.eyejackapp.com/

The EyeJack app is one of the easiest platforms to use because it’s essentially limited to adding a short video on top of a trigger image. The application must be installed on your computer. An audio upload is available to include a voice-over or ambient sound.

1. Download the EyeJack app onto your computer.
2. Upload a trigger image (JPG or PNG file).
3. Upload a video, GIF or PNG to layer on top of the trigger image in the augmented reality experience.
4. Keep the QR provided to view in the app.
5. Download the EyeJack app on your mobile device (iOS & Android).
6. Open the app and select the eye at the bottom of the screen. Scan the QR code (found in step 4) and then view the trigger image.

Cost: Free
Creation Platform: Download application on a computer
Ease of Use: Easy
Features: Use your videos and audio files

https://www.iste.org/explore/tools-devices-and-apps/www.lightup.io/HaloAR

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The Halo AR app is a new way to create augmented reality within the mobile application. In a few easy steps, students can build experiences on images by uploading or capturing a picture and then layering an AR experience on top of it. The AR layers can be from photos, videos or 3D objects on the mobile device or found in the library of content in the application. After the experience is published, those that follow you can view it in augmented reality.

https://mywebar.com/

The WebAR resource uses WebXR to make all the magic happen in the browser. Without the need to download an app, it makes the experience run much faster.

1. Go to mywebar.com and select “Sign Up” to set up an account.
2. Select “Add New Project.”
3. Give the project a name and select the type of AR experience you want (QR code is free), then select “Create.”
4. Upload or use the content available in the library to layer on the QR code.
5. Select the save image and scan the QR code with a mobile device.

Cost: Free for QR code
Creation Platform: Web-based
Ease of Use: Easy with added optional
Features: Use your videos and 3D object files, large 3D library on the site, added interactions in the AR experience

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e-teach
Upskilling Digital Pedagogy

Moduuli 7
Arviointi digitaalisissa oppimisympäristöissä

VUB

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MODUULI 7: ARVIOINTI DIGITAALISISSA OPPIMISYMPÄRISTÖISSÄ

Aysun Caliskan & Chang Zhu, Vrije Universiteit Brussel

SISÄLTÖ

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7.1. Moduuli 7, Oppitunti 1

Johdanto arviointiin digitaalisissa oppimisympäristöissä

Kesto: (asynkroninen ja synkroninen) (60 minuuttia)

Oppimistavoitteet: Tämän oppitunnin päätteeksi osallistujat:

1. Tunnistavat arvioinnin tärkeyden digitaalisissa oppimisympäristöissä
2. Osaa verrata perinteistä arviointia ja digitaalista arviointia
3. Ymmärtävät erilaiset arviointityypit digitaalisissa oppimisympäristöissä
4. Tutkivat digitaalisen arvioinnin mahdollisuuksia tukea summatiivista ja formatiivista arviointia
5. Osaavat luoda digitaalisen arvioinnin käyttäen digitaalisia työkaluja

Opetusmenetelmät/tekniikat:

- Vuorovaikutteinen esitys
- Ryhmäkeskustelu
- Kysely ja tehtävät
- Tapausanalyysit

Oppimis-opetusaktiviteetit:

Ennen oppituntia:

a. Tulevat opettajat tekevät aivoriihen erilaisista digitaalisista arvioinneista, joita he ovat kohdanneet tai käyttäneet menneisyydessä. He voivat jakaa kokemuksiaan, etuja ja haittoja kustakin tyypistä.

b. Opettaja antaa tuleville opettajille tapaustutkimuksen onnistuneesta digitaalisen arvioinnin toteuttamisesta todellisessa tilanteessa. Tulevat opettajat analysoivat tapauksen ja keskustelevat siitä, miten digitaalisia arviointityökaluja käytettiin, millaista arviointia hyödynnettiin ja analysoivat, miksi arviointi oli onnistunut.

Oppitunnin aikana:

a. Luennoitsija luo lyhyen vuorovaikutteisen kyselyn digitaalisista arviointiympäristöistä käyttäen digitaalista arviointityökalua ja antaa tulevien opettajien suorittaa sen.

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b. Seuraavaksi luennoitsija esittää sisällön käyttäen vuorovaikutteisia työkaluja (diatyyppiset esitykset).

c. Luennoitsija jakaa osallistujat pienryhmiin.

d. Pienryhmissään he keskustelevat erilaisista avaintavoista arviointiin (AoL, AfL, AsL) ja siitä, miten niitä voidaan käyttää digitaalisissa oppimisympäristöissä.

e. Ryhmätyön aikana he hahmottelevat eroja perinteisen arvioinnin ja digitaalisen arvioinnin välillä. He myös kirjaavat ylös kunkin arviointimenetelmän edut ja haitat sekä sen, miten digitaalista arviointia voidaan käyttää täydentämään perinteistä arviointia.

f. Opettaja ohjaa ryhmäkeskusteluja, vastaa kysymyksiin ja antaa palautetta.

g. Koko ryhmän vaihtaessa kirjallisia muistiinpanojaan.

h. Tulevat opettajat palaavat sitten pienryhmiinsä. Ryhmissään he luovat digitaalisen arviointiesimerkin valitsemallaan työkalulla. Tämä esimerkki liittyy tiettyyn oppimistavoitteeseen.

i. Kukin ryhmä jakaa sitten arvioinnit suuremmalle ryhmälle ja antaa palautetta toisilleen.

j. Oppitunti päättyy itsearviointiin siitä, mitä osallistujat oppivat oppitunnin aikana.

Oppitunnin jälkeen:

a. Tulevia opettajia pyydetään kirjoittamaan heidän omista kokemuksistaan digitaalisissa arvioinneissa, joko opiskelijana tai opettajana. He voivat keskustella siitä, miten he ovat käyttäneet digitaalisia arvioita menneisyydessä, mitä he oppivat oppitunnista ja miten he aikovat sisällyttää digitaaliset arviointityökalut tulevaan opetukseensa tai oppimiseensa.

b. Tulevat opettajat luovat wiki-/blogipostauksen ja julkaisevat sen johdannosta arviointiin digitaalisissa oppimisympäristöissä.

c. Tulevia opettajia kannustetaan lukemaan toistensa viestejä/sivuja ja antamaan palautetta tai kommentteja.

Arviointityökalut:

1. Kysely
2. Itsearviointi
3. Kirjoitustehtävä
4. Wiki-/blogipostauksen luominen

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Teoreettinen tausta (englanniksi)

1. Digital Technologies, Learning and Assessment

Over the years, digital technology has become an integral part in education which transforms traditional learning systems to modern learning systems (Sarker, Wu, Cao, Alam, & Li, 2019). In traditional learning, learners are restricted in time and space which burdens them to satisfy the learning environment. In response to that issue, digital technology is a tool to reach the requirements of the learning environment and resolve the problems of learning (Nganji, 2018). The integration of technology into education is an effective tool to gain knowledge and enhance the capacity for learning (Sarker, et al., 2019). The advent of digital technology has created new opportunities for communication, experiential learning, and assessment.

Indeed, digital technology facilitates student engagement through debates and discussions and thereby enhances the learning experience (Duţă & Martínez-Rivera, 2015).
Jian-Hua and Hong (2012) point to the digital platforms that allow immediate feedback to students and keep students engaged and motivated to learn. The integration of digital technology in education has brought about automated feedback mechanisms that allow students to reflect on their learning progress independently. According to a recent study, the use of regular assessments encourages learners to monitor their progress, increases their motivation to study, and positively affects their perception of their learning experience. Additionally, teachers also benefit from regular assessments as they can accurately measure their students' progress and adjust their teaching strategies accordingly for better results (McCallum & Milner, 2020).

Digital technology provides automated feedback to students, allowing them to reflect independently on their learning progress. According to a recent study, regular assessment helps learners monitor their progress, increases motivation, and improves their perception of learning. Teachers also benefit from regular assessments as they can measure what students have learned and adjust their teaching methods accordingly (McCallum & Milner, 2020).

Using digital technology within the assessment is not a new technological introduction to education. In one form or another, digital technology and assessment have been around for more than two decades. Early applications of technology aimed to improve efficiency and reduce costs in testing (Pellegrino & Quallmalz, 2010). Another early innovation concerned the delivery, recording and analysing of assessment data (Bull & McKenna, 2004). Throughout its lifetime, scholars have argued that it is a potential catalyst for change in traditional assessment practices and a response to growing assessment challenges (e.g., distance learning, objective and high-quality feedback, higher-order thinking) (Whitelock & Watt, 2008).

Despite recognizing the potential of technology in education, there is a limited implementation of technology-based assessment practices. This implementation mainly

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focuses on efficiency, standardization, grading, and data recording (Timmis, Broadfoot, Sutherland & Oldfield, 2016). Shute and Kim (2013) critique the literature, pointing out that the over-emphasis on technology is hindering the development of more imaginative and creative possibilities in learning and assessment. Although the impact of digital technology on education practices is still not entirely clear, the emergence of various interactive technologies presents an excellent opportunity for more engaging pedagogy and innovative assessment methods (Timmis et al., 2016). To explore this potential further, the following section highlights some of the key areas where technology is currently demonstrating its potential in assessment.

2. Assessment in Digital Learning Environments

Assessment is a core component of learning since it allows to measure how much the target outcomes are achieved (Narciss, 2012). As identified by Ausebel (1968), assessment is the most influential element affecting learning for teachers. The author indicates that teachers might decide on the current knowledge of the learners and thus teach accordingly. Including students, Black and Wiliam (1998) describe assessment as any kind of activity which provides information for a source of feedback both for teachers and students. Despite the various ways it may be desciribed, The term "assessment" encompasses the process of collecting, interpreting, and utilizing data to make informed decisions about a learner's educational achievements and performance (Harlen, 2007).

Assessments have evolved over the years to not only measure what students know, but also how they acquire knowledge and how they can apply it. In the nineteenth century, knowledge was viewed as a fixed and unchanging truth, and assessments reflected this perspective (Perry 1968).. However, in the 20th century, the idea of multiple perspectives and relative truths emerged, and assessments began to reflect this shift in societal views. (Perry 1968). With the emergence of social media, algorithms, and the availability of instant information in the 21st century, the understanding of knowledge and truth is also changing (Barnett 2017).

Although societal views on knowledge and truth have evolved, traditional assessment methods remain largely unchanged. These methods typically involve demonstrating knowledge through tests, quizzes, and essays, which can be easily compared and graded. However, in the current age where information is readily accessible, these assessments may be missing the point. They often place a heavy emphasis on recall and offer limited opportunities for students to provide their own input or make choices (Bearman, Boud, and Ajjawi (2020)

In order to better engage learners in the assessment process and promote learning, there has been a departure from traditional testing methods and a shift towards aligning with current trends in teaching and learning to keep up with the 21st-century skills that are expected from learners (Rusman et al., 2014). The emergence of the internet and innovations in information and communication technology (ICT) there has been an increased integration of technological tools in teaching and learning processes to keep up with 21st-century skills expected from learners (Rosenbusch, 2020). In addition, the

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Covid19 pandemic forced many educational institutions to accelerate their transformation towards technology integration, resulting in new learning environments both inside and outside the classroom. This change has necessitated a shift in assessment processes as well, since it was neither appropriate nor effective to use only traditional pen and paper testing. In response, technology-enhanced assessment methods have become an integral part of teaching and learning, bringing about radical changes in assessment practices. The rise of e-learning and technology-enhanced assessment methods reflect the need to align with current developments in both technology and pedagogy, and this has transformed the teaching and learning landscape. Whitelock and Brasher (2006).

Several studies, including those by Alruwais et al. (2018), Jordan (2013), Cazan & Indreica (2014), Kuzmina (2010), and Timmis (2016), agree that digital assessment has the potential to generate novel forms of learning that may not occur in traditional contexts. It is, thus digital assessment is more interactive, entertaining, and adaptive than traditional assessment methods (Simin & Heidari, 2013), Alruwais et al. (2018). Furthermore, computer-based assessment is easier to use and rapidly analyzes, corrects, and stores papers and scores, with an unlimited capacity to handle large data (Kuzmina, 2010). The results of computer-based evaluation are seen to have increased accuracy and reliability compared to traditional assessment methods. It is also less strict in terms of duration, with no pressure of time, and invigilation can be withdrawn in an e-assessment environment (Simin, & Heidari, 2013).

The adoption of e-assessment is driven by practical and pedagogical reasons. The former relates to its efficiency in dealing with the increased number of students and the enduring time reserved for their assessment, while the latter relates to its ability to adequately meet the principles that guide an assessment activity in relation to validity, reliability, efficiency, and diagnosticity. Al-Smadi & Guetl (2008). Instructors find it burdensome to correct students' answers and store their marks, especially when dealing with large-scale data Appiah & Tonder (2018). The limitations of traditional assessment methods, such as insufficiency of direct feedback and lack of creativity, have rendered learners restricted only to the task, decreasing their self-confidence and motivation Timmis et al. (2016), Pearse-Romera & Ruiz-Cecilia (2019). Yet, these scholars don’t deny the potential of traditional assessment. Instead, they believe combining technology with assessment has brought about new skills based on online collaboration, exchange, interaction, and peer assessment, which are important to cope with the changing world (Alruwais et al. (2018), Jordan (2013), Cazan & Indreica (2014), Kuzmina (2010), and Timmis (2016), Simin & Heidari, 2013).

7.2. Moduuli 7, Oppitunti 2

Arvioinnin keskeiset kysymykset digitaalisissa oppimisympäristöissä

Kesto: asynkroninen ja synkroninen (60 minuuttia)

Oppimistavoitteet: Tämän oppitunnin päätteeksi osallistujat:

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1. osaavat selittä, mitä validiteetti, reliabiliteetti ja epärehellisyys tarkoittavat digitaalisessa arvioinnissa.
2. osaavat yhdistää uutta tietoa näistä aikaisempaan ymmärrykseensä
3. osaavat vertailla arvioinnin keskeisiä kysymyksiä digitaalisessa ympäristössä
4. osaavat käyttää tietoa arvioinnin keskeisistä kysymyksistä kirjoittaakseen esseen uhkista, jotka liittyvät arviointiin verkko-opetuksessa.

Opetusmenetelmät/tekniikat:

1. Ryhmäkeskustelu
2. Yhteisöllinen oppiminen
3. Yksilötyö (esseen kirjoittaminen)
4. Vertaisarviointi käsitteellisistä kartoista

Oppimis-opetusaktiviteetit:

Ennen oppituntia (Asynkroninen sykli):

a. Tulevat opettajat (osallistujat) suorittavat esitestin pätevyydestä, luotettavuudesta ja epärehellisyydestä tunnistaakseen alueet, joissa he tarvitsevat tukea.

b. He lukevat myös materiaaleja (mittauksen ja arvioinnin tietopaperi digitaalisessa oppimisympäristössä, lisämateriaalit).

Oppitunnin aikana (Synkroninen sykli):

a. Tunti alkaa pääkäsitteiden kertauksella artikkelista ja esitestistä.

b. Sen jälkeen luennoitsija esittää sisällön vuorovaikutteisilla työkaluilla (diojenäytöt).

c. Luennoitsija kannustaa osallistujia luomaan käsitekartan pienryhmissä.

d. Pienryhmissään breakout-huoneissa he tunnistavat päätiedot validiteetista, reliabiliteetista ja epärehellisyydestä ja yhdistävät uuden tiedon siihen, mitä he jo tietävät (analysoi).

e. He määrittävät myös, miten validiteetti, reliabiliteetti ja epärehellisyys liittyvät toisiinsa (arvioivat). He käyttävät myös verkkoresursseja tutkiakseen ja kerätäkseen tietoa.

f. Palatessaan päähuoneeseen he esittelevät käsitekarttansa muulle luokalle ja johtavat luokkakeskustelun näiden käsitteiden tärkeydestä arvioinnissa.

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g. Tunti päättyy itsearviointiin siitä, mitä osallistujat oppivat tunnin aikana ja mitä he haluavat vielä tietää arviointiin liittyvistä kysymyksistä digitaalisessa ympäristössä.

Oppitunnin jälkeen (Asynkroninen sykli):

a. Opiskelijat suorittavat verkkoarvioinnin arvioidakseen ymmärrystään validiteetista, reliabiliteetistä ja epärehellisyydestä arvioinnissa.

b. He julkaisevat viestin keskeisistä arvioinnin kysymyksistä digitaalisissa oppimisympäristöissä wikissä/blogissa, jonka he loivat ensimmäisellä oppitunnilla.

c. Tulevia opettajia kannustetaan lukemaan toistensa viestejä/sivuja ja antamaan palautetta tai kommentteja.

Arviointityökalut:

1. Lyhyet vastaukset
2. Täytä tyhjät kohdat -kysymykset
3. Itsearviointi
4. Kirjoitustehtävät
5. Julkaise postaus omassa wiki-/blogissa

Teoreettinen tausta (englanniksi)

Key issues of assessment in digital learning environments

It is important to address key assessment issues to achieve desired outcomes in digital learning environments which is similar to those in traditional face-to-face learning environments. These issues are validity, reliability and dishonesty that take on new dimensions due to the interaction between students and teachers in digital (Oosterhof et al., 2008).

According to Wolsey (2008) and Hargreaves (2008), it is necessary to meticulously differentiate between validity and reliability concerning assessment for learning and assessment of learning. Formative assessment requires multifaceted contexts and alternative approaches to address the challenges related to validity and reliability in digital learning environments (Blair & Monske, 2009), and entails both the learning products and processes (Sorensen & Takle, 2005; Vonderwell et al., 2007). The upcoming sections will showcase the features of formative assessment in digital environments concerning academic dishonesty, as well as the significance of validity and reliability.

Validity

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In summative assessment, the concept of validity encompasses the evaluation of the extent to which test scores reflect the intended construct, and the inferences drawn from the scores align with the expected characteristics. According to Shaw and Crisp's definition (2011), validity requires sufficient evidence that test scores are measuring what they are supposed to measure, and that they are related to other variables as predicted. Following this unified conception, Gikandi, Morrow and Davis, 2011 assert that validity considers multiple measures and multiple sources of evidence over a continued period. In the current digital era, validity is related to the efficiency of significant assessment activities and feedback that promote inquiry-based learning, contextualization, and multidimensional viewpoints while offering ample support to learners. In line with these concepts, digital formative assessments must satisfy specific standards, such as authentic assessment activities, efficient formative feedback, diverse perspectives, and learner assistance (Deeley, 2019).

Reliability

Reliability in the context of digitalization involves the ability of students to demonstrate their progress and achievements through the documentation of evidence of their learning. Obviously, this provides opportunities for the monitoring of individual progress and identification of strengths and weaknesses, which can aid in taking measures to achieve the desired level of knowledge (Chung et al., 2006). Driessen et al. (2005) conducted a study aimed at redefining reliability in the context of formative assessment. They introduced a new concept wherein reliability in digital formative assessment pertains to the reliability and sufficiency of what is being evaluated to determine the level of knowledge structure being established. Using this definition, Deeley (2019) identified several attributes linked to reliability in online formative assessment, which include provisions for recording and tracking proof of learning, various sources of evidence of learning, and clear learning objectives and rubrics with shared definitions.

Dishonesty

In digital formative assessment, the issue of academic dishonesty is closely connected to both the validity and reliability of assessments. As implied by Oosterhof et al. (2008), increasing the level of validity and reliability can help minimize instances of dishonesty. Previous studies on the topic of dishonesty (Mackey (2009), Mackey & Evans (2011), Sorensen (2005), and Sorensen & Takle (2005), have highlighted the need for authentic assessment activities and adequate learner support for meaningful interactions and building students' confidence in digital settings.

As discussed above, validity, reliability, and dishonesty issues in digital learning environments, when compared to face-to-face environments have gained new dimensions. One of these different features is the types of interactions that differ with face-to-face settings. Therefore, the formative assessment of online environments should be designed to overcome potential risks. For example, Wolsey (2008) gave the effect of adequate feedback for negative communication due to inadequacy of physical interaction

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between students and teachers. An additional feature that sets online learning environments apart is the importance of structured dialogue between feedback providers and teachers. In other words, feedback should create continued student support and more opportunities for learning. It is also very important that students get quick online feedback and have sufficient time to respond. As noted by Vonderwell et al. (2007), this balance is required to create a more comprehensive and qualified discussion environment because students should first understand the topic well and organize their thoughts, and then respond to other online participants.
Incorporating the characteristics of digital formative assessment will create a shift in the conceptualization of validity, reliability, and dishonesty, thereby enhancing the functionality of digital formative assessment as an innovative pedagogical approach.

7.3. Moduul1 7, Oppitunti 3

Digitaalisen arvioinnin mahdollisuuksien tutkiminen

Duration: Asynkroninen & Synkroninen, 60 minuuttia

Oppimistavoitteet: Tämän oppitunnin päätteeksi osallistujat:

1. Ymmärtävät digitaalisen arvioinnin hyödyt ja mahdolliset käyttötavat opetuksessa.
2. Tuntevat tapoja, joilla digitaalista arviointia voidaan käyttää oman oppimisen tehostamiseen.
3. Osaavat verrata arvioinnin keskeisiä kysymyksiä digitaalisessa ympäristössä.
4. Osaavat käyttää tietoa digitaalisen arvioinnin tarjoamista mahdollisuuksista luodaksesi esimerkkiarvioinnin ja käyttää valittua digitaalista arviointityökalua.

Opetusmenetelmät/tekniikat:

1. Ryhmäkeskustelu
2. Yhteisöllinen oppiminen
3. Vertaisarviointi arviointiesimerkistä

Oppimis-opetusaktiviteetit:

1. Ennen oppituntia (Asynkroninen sykli):

   a. Tulevat opettajat (osallistujat) suorittavat esitestin tietämyksestään digitaalisen arvioinnin tarjoamista mahdollisuuksista (Mentimeter).

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b. He lukevat myös materiaaleja (mittauksen ja arvioinnin tietopaperi digitaalisessa oppimisympäristössä, lisämateriaalit).

2. Oppitunnin aikana (Synkroninen sykli):

   a. Tunti alkaa pyytämällä opiskelijoita pohtimaan perinteisten menetelmien esimerkkejä (esim. monivalintakokeet, kirjoitetut esseet...).

   b. Seuraavaksi luennoitsija näyttää lyhyen esityksen, joka korostaa joitakin digitaalisen arvioinnin keskeisiä etuja (ks. liite).

   c. Luennoitsija jakaa luokan pienryhmiin ja antaa kullekin ryhmälle tehtäväksi tutkia erilaisia digitaalisen arvioinnin työkaluja (esim. Kahoot, Quizlet, Google Forms jne.).

   d. Luennoitsija antaa jokaiselle ryhmälle kaavion tai mallin kirjata havaintonsa työkalujen ominaisuuksista, eduista ja haitoista.

   e. Jokainen ryhmä jakaa havaintonsa luokan kanssa ja keskustelee siitä, miten näitä työkaluja voitaisiin käyttää luokkahuoneessa.

   f. Luennoitsija pyytää jokaista opiskelijaa valitsemaan yhden tutkitun digitaalisen työkalun ja luomaan esimerkkiarvioinnin, jota voitaisiin käyttää luokkahuoneessa.

   g. Luennoitsija kannustaa myös opiskelijoita miettimään, miten työkalua voitaisiin käyttää arvioimaan erilaisia oppimistuloksia.

   h. Opiskelijat jakavat arvioinnit luokan kanssa ja saavat palautetta toisiltaan.

3. Oppitunnin jälkeen (Asynkroninen sykli):

   a. Opiskelijat suorittavat jälkiarviointikyselyn (Mentimeter) pohtiakseen oppimistaan ja miettiäkseen, miten voivat soveltaa oppimaansa.

   b. Heitä pyydetään myös osallistumaan verkkokeskusteluun ymmärryksensä syventämiseksi ja jakamaan lisää ideoita vertaisilleen.

   c. He julkaisevat viestin digitaalisen arvioinnin tarjoamista mahdollisuuksista wikissä/blogissa, jonka he loivat ensimmäisellä oppitunnilla.

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d. Tulevia opettajia kannustetaan lukemaan toistensa viestejä/sivuja ja antamaan palautetta tai kommentteja.

Arviointityökalut:

1. Ryhmätoiminta (perustuen erilaisten arviointityökalujen hyötyjen tutkimukseen)
2. Yksilötoiminta (opiskelijan luoma esimerkkiarviointi)
3. Itsearviointi (miten digitaalista arviointia voidaan käyttää)
4. Ryhmäkeskustelu verkkoalustalla
5. Julkaise postaus wikissä/blogissa

Teoreettinen tausta (englanniksi)

Opportunities offered by digital assessment

Digital technologies offer many opportunities for innovation in assessment. Below are the areas discussed with relevant literature.

Student Engagement with critical learning processes

Student engagement, initially defined as the student energy for academic experience (Astin, 1999), currently refers to the time, energy, and resources devoted to activities to enhance learning in educational settings. (Dunne & Owen, 2013). Student engagement is a tool for learning. As defined by Garrison and Akyol (2009), student engagement is achieved when they progress from basic interactions to meaningful discussions that are essential for constructing knowledge and understanding. The findings of previous studies (Angus & Watson, 2009; Lin, 2008; Wang et al., 2008) also confirm the importance of students engagement in blended learning environments. They agreed on the fact that engagement has increased through three types of meaningful interactions: interaction with content, interaction with others, and interaction with oneself. To enable meaningful interactions with content, a unique context is needed that provides students with materials and/or tools related to online formative assessment, a variety of challenging and engaging activities, and authentic circumstances. In order to take advantage of these contextual opportunities, a range of distinctive learning and assessment tasks, projects, and example scenarios may be required. Linked to that, students need to utilize online tools that facilitate collaborative inquiry, computer-based simulation tools (such as avatars), information search and presentation tools, and/or rich databases of information. Many studies have provided case studies of real-life situations that encourage learners to be more self-directed and increase their participation. The results revealed that interactions related to content have been shown to promote enduring engagement and significant learning experiences that enhance the learner's capacity to apply knowledge in new situations (Correia & Davis, 2008; Crisp & Ward, 2008; Lin, 2008; Mackey, 2009).

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In their study of meaningful interactions between students, tasks, and technological resources, Herrington et al. (2006) have shown that authentic tasks can foster in-depth understanding, increase students' ability to apply knowledge to practical situations, and encourage lifelong learning. Similarly, Lin (2008) and Wang et al. (2008) found that when students interact with process-oriented e-portfolios, this approach fosters a realistic learning environment that promotes collaborative learning and assessment through activities such as working together, documenting progress, sharing ideas, and reflecting on outcomes. It enables collaborative development of a shared understanding of expected performances, continuous monitoring and documentation of learning processes and outcomes, and offers a unique way to develop and evaluate student knowledge. By using this approach, students can take ownership of their learning and value their educational experience.
Similar to other scholars (Wolsey, 2008 & Vonderwell et al., 2007), Sorenson (2005) has shown that online environments can facilitate social interactions between students and teachers. He further added that when students share their work, views, and experiences in such environments, it creates dynamic opportunities for ongoing monitoring and evaluation, as well as diverse learning and assessment activities. This also expands the possibilities for identifying students' needs and providing ongoing support. Sorensen argues that participating in social contexts is a fundamental aspect of true professional practice which fosters the development of relevant and transferable skills for real-world situations.

While determining the outcomes of technology mediated interactions, teachers and students as human agents play an important role; however, it should be noted that technology itself can also influence the possibilities for shaping these outcomes. To fully understand and leverage the potential of e-tools in formative assessment, it is necessary to situate them within a comprehensive and broader understanding of effective learning (Patchker, et al., 2010). The authors propose that giving shared responsibilities to students can establish genuine settings that motivate them to participate in reflective and collaborative conversations within an online learning community. Mackey's research in 2009 also revealed that blending face-to-face professional work with online classroom contexts allows students to interact with others and facilitates peer formative assessment. In peer review process, students question or respond to the views of others who may have different or similar perspectives, both in online and real-world settings. This study also demonstrates that an authentic, collaborative, and reflective learning environment can be created through online formative assessment which allows students to share their learning experiences. These experiences replicate real communities of apprenticeships and enhance students' skills to use this knowledge in their professional practice.

In formative assessment, students take the opportunity to interact with self in online learning environment. This is due to extensive and flexible capabilities for documenting and describing evidence of student progress and achievement. Thus, teachers and students can monitor student progress. As mentioned earlier, this is consistent with previous scholars (Mackey, 2009; Mackey & Evans, 2011, and Vonderwell et al., 2007). Their findings indicate that students engage in self-evaluation by reflecting on their own process while carrying out learning and assessment activities. This, in turn, facilitates

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students in reflecting on and taking ownership of their work, as well as evaluating it. Moreover, the teacher can also use these insights to reflect on students' needs. In addition, Lin (2008) reports that students reflect on and evaluate the Works of their peers when they participate in training-oriented e-portfolio processes which facilitates their further learning. Online self-assessment questionnaires provide an additional avenue for individuals to enhance their self-interactions within digital environments. A case study by Smith (2007) showed that students value and benefit from receiving immediate feedback through self-tests. With this feedback, they may engage in self-assessment, reflect on their own learning and revisit the content for improvement.

New tools for assessment

The advent of technology has led to a growing utilization of digital tools such as text, images, videos, audios, data visualizations, and haptic feedback. These new tools offer various possibilities for demonstrating achievement in education and enable assessments to be designed in diverse ways. Moreover, they empower students to document their success and progress using various formats over different durations. Some examples of new tools include:

1. **Interactive quizzes and assessments.** These tools are types of interactive tests and examinations that typically involve multiple-choice, short-answer and drag-up questions. The use of digital quizzes and assessments allows for greater flexibility in administering and completing tasks as well as providing immediate feedback for student's performance. They can also provide self-paced learning and adaptive learning experience (Lopes, & Soares, 2022).
2. **Gamified assessments**. These tools are game-like elements in assessments to make them more engaging and interactive for students. They also increase student motivation and learning outcomes. Some examples include points, badges and leaderboards (Boudadi & Gutiérrez-Colón, 2020).
3. **AI powered assessments.** These tools use artificial intelligence (AI) to automatically grade a wide range of students' work including multiple choice tests, short answer questions, coding assignments, essays and even hand-written exams (Sánchez-Prieto, Cruz-Benito, Therón Sánchez & García Peñalvo, 2020).
4. **Virtual reality assessments**. Virtual reality technology is used to create immersive assessment environments. These environments can be used to assess spatial awareness, problem-solving and decision making skills. VR assessments have the potential to provide a more realistic and engaging assessment experience. Simulations, virtual worlds and VR games are some of the examples of VR assessment forms (Molina-Carmona, R., Pertegal-Felices, M. L., Jimeno-Morenilla, A., & Mora-Mora, H. (2018).

Those tools integrate assessment into learning activities and assessment in digital environments includes addressing real-life problems within a virtual world. They also have the potential to make assessment more efficient, effective and engaging for

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students and teachers. However, it is important to note that these tools are not a replacement for human teachers, they are tools to assist the teachers and improve the assessment process.

Fostering equal opportunities in education

Digital formative assessment has the potential to promote equitable education by offering various learning opportunities according to the unique needs of individual students. In Gikandi, Morrow and Davis' view (2011), it enables adaptive teaching and assessment approaches for the individual needs and also promotes the continual growth and improvement. This may result in increasing equity for online students.

As described in Jenkins (2005)'s review, effective online formative assessment should focus on the strengths of students and their capacity to improve through targeted interventions rather than focusing on their weaknesses. According to Sorensen, 2005; Sorensen & Takle, 2005, formative assessment emphasizes that all students are potential experts and allow opportunities to all the students to demonstrate their expertise. Moreover, online formative assessment creates supportive and collaborative environments where students can easily express their thoughts, ask questions and/or engage with different perspectives of their peers . This is certainly evident in Vonderwell et al. (2007) and Fornauf and Erickson's (2020) studies. To facilitate online peer and self-assessment, a collaborative learning approach was employed by the researchers. Vonderwell et al. (2007) highlighted that various assessment activities can be helpful for advancing equitable education as they offer diverse indicators and alternative tools for students to present their own abilities. Lin (2008) found that students evaluate their own learning and accomplishments and determine areas which require improvement in order to reduce performance gaps, thereby fostering equal opportunities in education.

Supporting and enhancing collaborative learning and assessment

Van Aalst and Chan (2007) noted that the rise of Networked and Web 2.0 technologies provide opportunities for collaborative learning and assessment approaches, including co-evaluation and peer assessment. With the support of digital technologies, individuals can engage in peer-to-peer data sharing, collaborative knowledge construction, and peer review.
Therefore, it becomes possible for learners to collect, share and comment on the data using synchronous and asynchronous technologies (De Alfaro & Shavlovsky, 2013). As discussed above, the use of digital resources can help students collaborate in different ways both inside and outside of formal education environments. Timmis et al. (2016) argue that this collaborative work can help to move assessment from an individualistic approach to a more practical one that aligns with real World problem solving.

Assessing higher-order skills

In the relevant literature, it is mentioned that digital assessment creates opportunities to assess cognitive skills (Brown, 2012) spanning from lower-order thinking skills (LOTS) to

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more advanced higher-order thinking skills (HOTS). Some projects (Pellegrino & Quellmalz, 2010) use simulations and immersive environments to assess higher-order skills such as hypothesis testing, role-playing and problem-solving. In addition, the literature frequently emphasizes the potential of digital technologies for assessment, particularly in relation to immersive and game-based environments.

In those environments, teachers may give direct online feedback and direct online feedback may be given by teachers and assessment teachers may give direct feedback online and collect assessment data. Implementing such an approach has the potential to enhance both student engagement and performance in their coursework, as suggested by Hickey et al. in 2009. However, these methods are limited in traditional classroom settings due to the challenge evaluating performance in contextual scenarios such as risky scientific experiments, natural phenomena, or fictional situations (Pellegrino & Quellmalz, 2010).

Enhancing immediate feedback

Digital technologies have improved and provided opportunities for immediate feedback. As demonstrated by Wolsey (2008), providing immediate (formative) feedback helps students in revising their work and enhancing their comprehension. As a result, it may allow students to gain self-engagement and self-regulation skills. Similarly, Formative feedback can promote student motivation and engagement, resulting in better academic performance (Crisp & Ward, 2008). Upon reviewing the literature on formative assessment and its diverse opportunities, Sorensen and Takle (2005) recognized that interactive and collaborative online learning communities foster dynamic and meaningful interactions. Linked to that, Vonderwell et al. (2007) focused their research on collaborative learning as a strategy for implementing peer and self-assessment for formative purposes. Their study also indicated that asynchronous discussions gave students enough time to compose and share their ideas. As a result, this approach promoted reflective and self-assessment procedures. When compared to traditional f2f settings, the effectiveness of immediate feedback in digital educational settings has many characteristics. Koh's (2008) review revealed that in online learning settings, immediate feedback can facilitate deep learning, motivation, self-esteem, self-regulated learning, and transferable skills. Additionally, Wolsey (2008) demonstrated how computer applications and software can enhance the effectiveness of feedback in online environments, enabling more thorough and comprehensive written feedback that is integrated into student work. These aspects are critical in fostering meaningful dialogue between teachers and students. In consistent with what Wolsey (2008) suggests, Gikandi, Morrow and Davis (2011) demonstrate that teachers can monitor and thus identify the weaknesses and strengths of students and provide immediate feedback which is visible to all (scaffolded interventions). Such opportunities can support learning processes that allow more student engagement.

7.4. Moduuli 7, Oppitunti 4

Digitaalisen arvioinnin haasteet ja riskit

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Kesto: Asynkroninen & Synkroninen, 60 minuuttia

Oppimistavoitteet: Tämän oppitunnin päätteeksi osallistujat:

1. Tunnistavat digitaalisen arvioinnin haasteet ja riskit.
2. Osaavat kehittää strategioita haasteiden ja riskien lieventämiseksi digitaalisessa arvioinnissa.
3. Osaavat soveltaa oppimaansa realistisella tavalla skenaario-pohjaisessa toiminnassa.

Opetusmenetelmät/tekniikat:

1. Ryhmäkeskustelu
2. Yhteisöllinen oppiminen
3. Yksilötyö (esseen kirjoittaminen)
4. Vertaisarviointi käsitekarttojen osalta

Oppimis-opetusaktiviteetit:

1. Ennen oppituntia:

   a. Tulevat opettajat (osallistujat) lukevat materiaaleja (mittauksen ja arvioinnin tietopaperi digitaalisessa oppimisympäristössä, lisämateriaalit).

2. Oppitunnin aikana:

   a. Tunti alkaa esityksellä digitaalisen arvioinnin riskeistä ja haasteista.

   b. Osallistujat tiivistävät ennen oppituntia lukemansa artikkelit.

   c. Luennoitsija jakaa luokan pienryhmiin ja luo skenaarion mahdollisista haasteista digitaalisten arviointien toteuttamisessa peruskouluissa/yläkouluissa.

   d. Pienryhmissä osallistujat työskentelevät yhdessä suunnitellakseen ratkaisuja peruskouluissa/yläkouluissa esiintyviin digitaalisen arvioinnin haasteisiin ja riskeihin. He kehittävät myös ratkaisuja niiden lieventämiseksi.

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e. Luennoitsija vierailee jokaisessa pienryhmässä tarjoten ohjausta ja tukea tarvittaessa.

f. Oppitunnin lopussa he käyvät läpi pääkohdat ja vastaavat mahdollisiin jäljellä oleviin kysymyksiin. Opiskelijoita pyydetään täyttämään pohdintapäiväkirja, jossa he keskustelevat haasteista ja ehdottavat ratkaisuja.

3. Oppitunnin jälkeen:

a. Opiskelijoita pyydetään kirjoittamaan pohdintapäiväkirja, jossa he keskustelevat haasteista ja ehdottavat ratkaisuja.

b. Opiskelijat arvioivat ja antavat palautetta toistensa päiväkirjoista.

c. He julkaisevat viestin digitaalisen arvioinnin haasteista ja riskeistä.

d. Tulevia opettajia kannustetaan lukemaan toistensa viestejä/sivuja ja antamaan palautetta tai kommentteja.

Arviointityökalut:

1. Itsearviointi
2. Vertaisarviointi
3. Pohdintapäiväkirjan kirjoittaminen
4. Julkaise viesti wikissä/blogissa

Teoreettinen tausta (englanniksi)

Challenges and risks of digital assessment

The preceding section highlights the significant areas where digital assessment can introduce innovative approaches to enhance learning and assessment, along with the advantages offered by digital technologies. However, it is also crucial to acknowledge the potential challenges and risks they bring, particularly when used in assessment that involves the collection and analysis of data. Assessment plays a critical role in determining learners' futures and raises various ethical concerns. This section provides a brief overview of the potential hazards linked to the use of digital technologies in assessment.
It is equally apparent hat digital technologies can also pose both challenges and threats. This is especially the case when utilized for assessment purposes. Collecting and analyzing data is a critical aspect of assessment that can significantly impact a learner's future, thereby raising several ethical concerns. This section provides a brief overview of the potential risks associated with the use of digital technologies.

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The role of technology in assessment

The assessment aspect in digital innovation is still underdeveloped, with technology dominating the use of on-screen testing. According to Winkley (2010), multiple-choice questions and automated marking are the most commonly used methods for assessing students. Mansell (2009) echoes similar sentiments, highlighting that on-screen testing is not yet widely adopted for external examinations and is primarily known within the enthusiast community. Whitelock and Watt (2008) argue that assessment in digital environments often follows a "transmission" model of teaching and learning, which focuses on delivering information rather than promoting active knowledge building of students.
Even in areas of accepted innovation, designers of digital learning environments tend to overlook the importance of assessment. Shute and Kim (2013) observed that existing immersive games lack adequate assessment infrastructure, limiting their potential for maximizing learning outcomes.

Simulations use various and costly technologies. According to Gee and Shaffer (2010), when it comes to immersive environments and educational computer games, the assessment process often lags behind the design of the environment and learning tasks. Therefore, they suggest that the development of games for assessment purposes should be prioritized. If not, as stated by Winkley (2010), assessment in games can become excessively implied, leading students to overlook crucial details in the outcomes they receive.

The lack of engagement in assessment

There are problems in culture, expertise and inertia in the integration of technology into assessment. Timmis, et al. (2016)) arguably find that a lack of engagement among innovators, designers, educators, and researchers in the assessment process is the root of the problem. Consistent with that, Van Aalst and Chan (2007) note that there has been little emphasis on evaluating the collaborative aspect of computer-supported collaborative learning (CSCL), leading to incompatible assessment practices. They argue that a collaborative culture of assessment is necessary, where learning and assessment are integrated, not focusing on individual competition and performance. The perception that collaborative or peer assessments are unfair and unequal is held by many institutions, teachers, and students. This perception acts as a significant obstacle to the implementation of more innovative forms of collaborative assessment, as noted by Ferrell (2012).

Risks of adopting digital assessments

There is a concern that the advancement of digital technologies may result in a shift towards technology-centric design of assessments. This was exemplified in the work of Sutherland et al. (2012). They indicated that computer scientists initiated digital assessments with little consideration for educational purposes, potentially leading to the risk of technology driving educational and assessment practices. Instead of taking a technology-centric focus, some scholars have stressed the importance of cultural, social

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and institutional context while looking at any innovation (James, 2014).Others focus on the role of feedback in assessment and connect it to research. These authors advocate for models that prioritize pedagogy, enabling students to take charge of their own learning and promoting reflection (Whitelock & Watt, 2008; Boud & Molloy, 2013).

An even more concerning risk is the common use of digital data for assessing school performance and improvement in many countries. It is believed that this is a positive development because it may lead to an objective and thorough understanding of student progress (Sutherland, 2013). However, there is a growing debate on the assumption of learning analytics, data collection and interpretation of large data sets. The increased use of digitized assessment data in education is raising awareness of potential threats. Foley and
Goldstein (2012) challenges the notion that "data deluge" is wholly advantageous, given that the analysis of such data (e.g., exam results, league tables) can be flawed and prejudiced.

Ethical issues associated with implementing digital assessment

The use of technology in education has potential risks, including ethical challenges associated with "big data." These challenges include concerns about consent, data protection, ownership, and information control. These ethical responsibilities are important for educators to consider when implementing technology in the classroom (Facer, 2012). As technology enables the assessment of a wider range of skills and attributes, questions arise as to what data should be collected and what is considered acceptable or desirable to measure. These questions should guide the development of assessment tools and resulting practices (Oldfield, Broadfoot, Sutherland & Timmis, 2012).

The risks of social exclusion associated with digital assessment

The emergence of digital cultures and social networking can bring about issues of labeling and social exclusion, potentially exacerbating existing inequalities. One example is the use of Web 2.0 technologies, which provides learners with fresh opportunities to actively participate in creating content, sharing information, communicating, and collaborating. According to Boyd (2011), the benefits may not be equally distributed among students. This is because the online space replicates offline social dynamics, and students need to feel a sense of trust in the learning environment. Jenkins et al. (2006) refer to this phenomenon as the "participation gap." This gap is also relevant to digitally enhanced assessment, which is often integrated into online group activities using wikis or discussions. As contributions are visible, this can limit participation in formative assessment (Timmis et al., 2010). Furthermore, online summative assessment can exacerbate achievement differences and reinforce social divisions (Dawson, 2010). It is important to recognize that students may not have equal participation or benefit from online activities in the same manner. Therefore, the potential risks of social exclusion should be taken into account when designing any digital assessment (Timmis et al., 2016).

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