

Academic Discussion - Design & Technology Lesson Plan

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This Design and Technology stage 5 lesson plan; combines assessment and scaffolding sequences characterising the original lesson plan; with improvements to quality teaching elements including student direction, knowledge integration, explicit quality criteria, and metalanguage (NESA, 2003). Positioned 150 hours into a 200-hour scope, the lesson introduces the Design Processes core unit, encompassing a student negotiated design project around digital or information and communication technologies (ICT) (NESA, 2021, 2019). Herein, I will outline how knowledge scaffolding, student-centred learning (SCL), and inquiry-based learning (IBL) strategies are employed for best practice; exploring methods of assessment and classroom management which adhere to NESA's (2018) graduate Australian Professional Standards for Teachers (APST).

Vygotsky's "zone of proximal development" (Arnett, 2013, p.90) acknowledges the socio-cultural knowledge gaps which impact student cognition, informing methods of teacher and peer scaffolding. The lesson provides sequential information delivery, lowering element interactivity, reducing cognitive load (Hanham et al., 2017), and utilising ICT content to assist active learning (Clark & Mayer, 2016, pp.82-103) — also supporting general ICT capabilities (NESA, 2019, p.9). The design process video (Ask.Learn.Inspire, 2018) followed by student directed class discussion — supported by slides highlighting key terms; act as diagnostic assessment of intellectual qualities such as deep knowledge and understanding of the "design process" (NESA, 2019, p.26) and metalanguage (NESA, 2003). The subsequent task synthesises the content with individual student knowledge to explore design considerations with contextual integration of problematic knowledge. This scaffolding sequence repeats, introducing new concepts and peer-to-peer support, to encourage higher-order thinking about factors affecting designers' work (NESA, 2019), also providing ample opportunity to refine the earlier task and integrate knowledge. John (2007) challenges rigid linear lesson planning, recommending a fluid approach where student "responses create an ever-changing dynamic for teaching" (p.484), supporting achievement of substantive communication by employing student feedback, and embracing variation of

lesson continuity and time allocation accordingly. Professional knowledge encompassing “content selection and organisation” (NESA, 2018, p.10) is evident in the constructivist lesson continuity, endorsing diagnostic assessment and identification of students’ “physical, social and intellectual [developments]” (NESA, 2018, p.8) which impact learning, to engage effective scaffolding for intellectual qualities (NESA, 2003).

SCL aims to “understand how students learn” (NESA, 2018) and foster autonomous endorsement of learning goals “applicable to their lives” (Wong, 2021, p.94). The design project (NESA, 2021) demonstrates connectedness, and knowledge integration of core content with individual selections of cross-curriculum and general capabilities including sustainability, ethical understanding, and diversity (NESA, 2019), recognising students’ background and cultural knowledge (NESA, 2003). Students’ problem-solving narratives are converted to formative homework assessment, guided by the Design Process Worksheet — aligned with syllabus outcomes (NESA, 2019) — encouraging students to connect lesson content with their project brief. Lesson outcomes, background knowledge, student autonomy, interests, literacy, and ICT foundations, can be assessed holistically to determine student capabilities, subsequently used for differentiation. Applications include, approachable template briefs for life skills students, additional interest area integrations to challenge gifted students (Gross et al., 2007), and in-class project time allocation to provide; ICT access for students without it; literacy support for EAL/D students; and scaffolding to meet “specific learning needs of students across the full range of abilities” (NESA, 2018, p.9). The plan demonstrates professional knowledge of student characteristics, ensuring inclusivity and quality teaching significance (NESA, 2003), utilising SCL strategies and formative assessment data to meet students’ needs.

IBL integrates declarative knowledge with activities which engage students’ “personal and social [capabilities and] critical and creative thinking” (NESA, 2019, p.26), within the discipline (Voet & De Wever, 2019). A quality teaching environment; in-class or remotely (Kiernan, 2020); supports effective IBL, involving clear direction of students’ energy (Gore,

2007, pp 15-33), supported risk-taking, and exploring interests and capabilities; whilst allowing teachers to assess and differentiate accordingly. Proactive classroom management enhances learning environments and keeps students on task (Clunies-Ross et al., 2008). By providing the lesson agenda, activity instructions, and by combining the worksheet and slides for inquiry-based knowledge synthesis, explicit quality criteria (NESA, 2003) is exhibited throughout the lesson. Students safely explore interests through individual tasks, socially supported by paired scaffolding. Time allocation for class discussion about the upcoming summative formal assessment is negotiated proactively, in exchange for student direction and self-regulation; simultaneously setting high expectations and empowering students to connect with tasks at hand. ICT use increases equitable learning opportunities for students with special needs (Alexopoulou et al., 2019). Classroom use also benefits student independence, risk-taking (Alexopoulou et al., 2019), critical thinking, motivation, engagement, data collection for assessments (Dawson, 2008), teaching and classroom management (Livingstone, 2012). The worksheet resource breaks down the design process to “achievable challenges for students” (NESA, 2018, p.12), differentiating for all abilities, including students who may struggle with executive function regulation and working memory, which interferes with learning goals (Alexopoulou et al., 2019). Furthermore, remote access and file sharing is central to contemporary teaching amid and after the Covid-19 pandemic (Kiernan, 2020). Consolidated with effective classroom management, ICTs can be used to “expand curriculum learning opportunities for students” (NESA, 2018, p.11), and promote better engagement for a quality learning environment.

Designed for best practice, the Design and Technology lesson plan takes into consideration, quality teaching frameworks (NESA, 2018, 2003), the original plan, APST graduate standards, lesson sequence, syllabus scope (NESA, 2019), and “curriculum, assessment and reporting knowledge” (NESA, 2018, p.9). The constructivist approach effectively integrates core content with an inquiry-based design project, harnessing teaching strategy selections to optimise student engagement and connection, diversifying lesson materials, employing ICTs and IBL activities. The lesson sequence adaptability recognises the significance of SCL to quality teaching, creating an environment where

students actively engage in directing their learning. Diagnostic assessment combined with explicit instructions informs scaffolding content to build intellectual qualities, synthesised with student background knowledge to optimise learning. Formative assessment confirms if students' content knowledge application ability, informing proceeding differentiation for inclusive and engaging classroom management.

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Reference List – Academic Discussion

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