

Student-generated videos as assessment tools to enhance learning outcomes in K-12 education: A systematic review

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ABSTRACT

Grounded in active learning, this systematic review synthesizes research on the use of student-generated videos (SGVs) as assessment tools and their influence on learning outcomes in primary, secondary, and high school education. Guided by preferred reporting items for systematic reviews and meta-analyses, 14 peer-reviewed studies published between 2015 and 2024 were analyzed. Findings indicate that SGV assessments enhance learning outcomes, including digital literacy, critical thinking, collaborative problem-solving, and deeper conceptual understanding. Although it is unsurprising that SGVs enhance digital literacy and collaborative problem-solving, this study confirms that these benefits consistently occur across multiple K-12 levels and settings, demonstrating that SGV assessments can reliably support active learning in diverse contexts. Thematic analysis highlights factors influencing effectiveness, such as instructional strategies, scaffolding, self-efficacy, and educational level. Specifically, students with higher self-efficacy demonstrate greater engagement and performance in SGV assessments, while targeted instructional strategies enhance students' confidence and capability in completing video-based assessment tasks. Additionally, SGV assessments foster transferable skills that extend beyond academic outcomes. Challenges, including technological barriers and varying levels of student self-regulation, are also identified. The study emphasizes the importance of tailored instructional design, explicit assessment criteria, and strategies to support self-efficacy in video-based assessments. Future research should explore longitudinal effects and investigate approaches that address diverse learner needs in digital assessment environments.

Keywords: student-generated videos, assessment, K-12 education, active learning, digital literacy, self-efficacy, multiliteracies

INTRODUCTION

With the widespread adoption of technological advancements, research on the impact of digital presentations on learning outcomes has emerged. Before the advent of COVID-19 pandemic, researchers and experts in the field of education have already explored topics such as online distance education, teacher training, and teaching transformation through digital technology (Borba et al., 2010; Makarova & Makarova, 2018). However, the COVID-19 pandemic has brought unprecedented challenges to the field of education, prompting a rapid and widespread adoption of digital technologies in teaching and learning (W. Zhang et al., 2020), effectively implementing many theoretical approaches about digital learning into widespread practice. With the rise of short video platforms like TikTok and Instagram, the number of global Internet users was projected to reach 5.3 billion in 2023 (Cisco, 2023), and video content constitutes a significant portion of this total. This empowers educators to use video as

a dynamic means to teach interactive and multimedia-rich content, enhancing student engagement and comprehension (Jorm et al., 2019; Müller et al., 2019). Furthermore, some teachers have started using videos as an assessment method in their pedagogy (Hannafin et al., 2010; Reeves et al., 2017). These developments indicate that the use of videos in teaching is becoming increasingly vital.

However, while the impact of video consumption is well-documented (Campbell et al., 2022; Müller et al., 2019; Noya et al., 2022; Zhu et al., 2022), the systematic investigation of student-generated videos (SGVs) specifically as an assessment method to demonstrate and deepen learning in K-12 remains scarce (Atkinson et al., 2024; Graul et al., 2022; Ribosa & Duran, 2022a, 2022b; Snead et al., 2023). In the post-pandemic era, where students have greater access to digital presentation tools and artificial intelligence, as an important question emerges as they return to classrooms: beyond passively receiving knowledge through teachers' educational videos, can students effectively create SGVs to demonstrate their learning

and express their understanding? Thus, this research focuses on examining whether, and how, SGVs as an assessment method influence learning outcomes. This systematic review seeks to provide a comprehensive overview of current evidence regarding the impact of SGVs on K-12 students' learning outcomes, offering valuable insights for future instructional practices. Understanding the effectiveness of SGVs in the post-pandemic educational landscape is crucial for educators, policymakers, and curriculum developers.

LITERATURE REVIEW

Theoretical Framework

Our systematic review is grounded in active learning (Cooperstein & Kocevar-Weidinger, 2004), a pedagogical approach grounded in constructivism (Mintzes, 2020). It emphasizes learners' construction of meaning by connecting new ideas to their existing knowledge. In this research, active learning is characterized by the use of cognitive, meta-cognitive, affective, and resource management strategies (Anthony, 1996). These strategies are critical for helping students manage the high cognitive demands of a constructivist learning environment, where the learners are expected to take an active role in their own learning journey.

Constructivism suggests that learners actively build new knowledge by integrating it with their existing knowledge base (Mintzes, 2020). It emphasizes that understanding is actively constructed rather than passively absorbed. This principle aligns closely with active learning, which requires students to engage with content through strategies such as peer teaching, collaborative problem-solving, and inquiry-based tasks. In K-12 contexts, these strategies can take the form of elementary students creating digital storyboards to explain math concepts, middle school learners producing short science experiment videos, or high school students designing multimedia presentations to showcase historical analysis. Such practices encourage reflection, application, and synthesis of knowledge while fostering creativity and communication skills. Both constructivism and active learning emphasize learner autonomy, deep engagement, and critical thinking, shifting the emphasis from a teacher-centered model to one where students actively shape and direct their own learning process.

Thus, SGVs emerge as a practical embodiment of both active learning and constructivist principles. In creating videos, students move beyond passively consuming information to actively processing, synthesizing, and presenting their understanding in a creative format (Yang & Wu, 2012). The video creation process typically involves several steps such as researching content, organizing ideas, selecting appropriate digital tools, and editing the final product (Oliszewski et al., 2018). Each step engages learners both cognitively and metacognitively (Colognesi et al., 2020), requiring them to evaluate their learning, make purposeful decisions about how to represent information, and reflect on the knowledge they are demonstrating. This process reflects the constructivist view that knowledge is most effectively developed when it is actively constructed by the learner (Mintzes, 2020).

Given that active learning emphasizes learners' active engagement and reflection, self-efficacy becomes essential for understanding how students participate in and benefit from SGV activities (Coulson & Frawley, 2017; Greene, 2014). According to Bandura's (1986) social cognitive theory, self-efficacy is shaped by an individual's evaluation of their abilities in relation to specific tasks, and is strongly influenced by direct experiences of success, observation through modeling, and feedback. Wong et al.'s (2023) study of undergraduates in California found that self-efficacy predicts mind-wandering, and that mind-wandering partially mediates the relationship between self-efficacy and online engagement, ultimately affecting learning outcomes. Other studies also demonstrate that self-efficacy plays a significant role in the effectiveness of SGVs across disciplines including engineering, music, and physiotherapy by enhancing digital literacy, reducing anxiety, and fostering confidence (Ariza, 2023; Coulson & Frawley, 2017). While motivated and confident students tended to perform well, those with lower self-efficacy often perceived the assignment as burdensome (Coulson & Frawley, 2017). Therefore, self-efficacy serves as a crucial metric for evaluating the impact of SGVs on learning outcomes.

Today's younger generation has grown up in an era of rapid technological advancement and pervasive digital products, making them highly connected to the internet and proficient in digital applications (Arruabarrena et al., 2021). For instance, they frequently engage with blogs, video editing software, and social media platforms to create and share content (Ribosa & Duran, 2022a, 2022b). In response, there is a growing trend toward incorporating student-generated content into pedagogy, positioning students not only as consumers of knowledge but also as creators (Doyle et al., 2021; Snowball & McKenna, 2017).

Video production, a specific form of student-generated content, is increasingly recognized as essential in the effective use of technology in education (Kay, 2012; Orús et al., 2016; Pereira et al., 2014). However, living in an era of abundant and efficient information dissemination does not automatically translate into strong digital literacy. One of the primary benefits of SGVs, therefore, is their potential to foster digital literacy. Empirical research supports this approach, showing that an educational experiment in which students created instructional videos in physics and chemistry led to significant improvements in both digital and scientific skills when students actively engaged in all stages of the production process (Gallardo-Williams et al., 2020).

Similarly, Murray et al. (2023) demonstrated that integrating student-generated filmmaking into undergraduate teaching and assessment enables learners to combine interdisciplinary academic research with transferable skills such as communication and collaboration. By requiring students to appreciate diverse disciplinary perspectives and work together to solve problems (Nance & Nance, 2011), this approach reflects a major educational trend toward interdisciplinary collaboration and innovative research.

The rapid advancement of video production tools and the growing availability of digital platforms have transformed the educational landscape. Today, teachers and students can access, share, reuse, manipulate, and create video content with

unprecedented ease (Gedera & Zalipour, 2021). These technological advances have facilitated the widespread integration of video-based learning resources across multiple educational contexts. SGVs are considered a form of video-based assessment, as they transform the learning process into an assessable performance artifact (Hobbs, 2017; Vale & Falloon, 2024). Effective video-based assessment requires intentional pedagogical design, as meaningful integration of technology depends on aligning learning goals, instructional strategies, and assessment criteria (Albertson & Johnston, 2023). Yet teachers often emphasize technical aspects, such as editing and sound effects, over the depth and quality of student learning (Hobbs, 2017), underscoring the need for ongoing refinement of assessment practices, particularly through clearer and pedagogically grounded rubric design.

To address this challenge, teachers have begun using rubrics that break the task into distinct dimensions such as technical, conceptual, and reflective dimensions of SGVs, thereby weighting learning evidence more heavily than production quality (Gedera & Zalipour, 2021). Making these criteria explicit from the onset helps students understand what matters most and supports self-assessment that emphasizes meaning-making (Husbye & Vander Zanden, 2015; Shadieff et al., 2022; Vale & Falloon, 2024). Furthermore, incorporating guided reflection and iterative feedback provides additional justification for this approach, as it shifts both teacher and student attention away from surface features and toward the deeper cognitive and creative processes involved in video production (Young & Rasinski, 2013).

Despite these pedagogical benefits, research shows that most implementations of SGV assessments still occur in higher education. K-12 teachers face persistent challenges including limited time, insufficient training, and concerns about ethical or technical challenges (McGrail & Behizadeh, 2017; Rice & Ortiz, 2021). As a result, video-based learning and assessment practices in K-12 are still underdeveloped compared to higher education contexts (Snead et al., 2023).

Recent educational innovations emphasize the importance of student-generated content as a means to promote active learning and learner autonomy. Among these, SGVs such as filmmaking (Young & Rasinski, 2013) and video creation (Husbye & Zanden, 2015) have emerged as a powerful instructional strategy, positioning students as co-creators of knowledge rather than passive recipients. This aligns with constructivist learning theory, which posits that knowledge is actively constructed through engagement, interaction, and reflection (Vygotsky, 1978). Additionally, SGVs resonate with the multiliteracies framework, developed by the New London Group (1996), which underscores the need for learners to engage with multiple semiotic modes including visual, textual, and auditory, gestural, and spatial resources, while developing critical and creative competencies for the digital age (Cope & Kalantzis, 2009, 2015; Kalantzis & Cope, 2008, 2012; Kalantzis et al., 2016).

Viewed through the lens of multiliteracies, communication and learning are multimodal acts of (re)designing meaning-making, as students actively select, combine, and transform semiotic resources to construct knowledge (Jewitt & Kress, 2003; Kress & Van Leeuwen, 2001; Kress et al., 2001; Magnusson & Godhe, 2019; Zapata et al., 2023). SGV

exemplifies this process: through voiceovers, visuals, editing, and digital effects, students design knowledge artifacts shaped by both personal insight and socio-cultural contexts. This framework emphasizes that students both acquire content and actively make meaning through multimodal design, enhancing inclusivity, creativity, and digital participation (Sánchez-López et al., 2019).

Despite their theoretical and practical promise, SGVs in K-12 education face several challenges. Many teachers lack training in digital pedagogies and encounter barriers when selecting and implementing video tools (Nixon, 2012; Rice & Ortiz, 2021). Ethical issues, such as privacy concerns, further contribute to teacher reluctance (McGrail & Behizadeh, 2017). Furthermore, teachers often struggle to design assessments that balance technical performance with conceptual depth (Albertson & Johnston, 2023). As Hobbs (2017) notes, evaluations of SGVs frequently overemphasize surface-level features (e.g., editing quality and sound effects) while neglecting the quality of content and higher-order thinking skills. This points to a need for robust assessment frameworks that integrate both cognitive and technical dimensions of learning.

Thus, the purpose of this systematic review is to synthesize existing literature on SGVs in K-12 education, with a focus on their impact on learning outcomes, mediating factors such as self-efficacy, and the development of transferable skills. This study seeks to address the following research questions:

1. What is the impact of SGVs used as an assessment method on students' learning outcomes across primary, secondary, and high school education?;
2. What factors influence the effectiveness of SGV assessments in enhancing students' learning outcomes across different educational settings?;
3. How does students' self-efficacy influence their performance on SGV assessments?;
4. What instructional strategies or interventions enhance students' self-efficacy in SGV assessments?; and
5. What transferable skills do students develop through SGV assessments?

METHOD

Our systematic review was conducted in the accordance with the preferred reporting items for systematic reviews and meta-analyses (PRISMA) (Moher et al., 2009) (see **Figure 1**) using the following search terms: ("student-generated video" OR "student-created video" OR "student-produced video" OR "student-made video" OR "student-developed video" OR "student-authored video" OR "pupil-generated video" OR "pupil-created video" OR "pupil-produced video" OR "pupil-made video" OR "pupil-developed video" OR "pupil-authored video" OR "learner-generated video" OR "learner-created video" OR "learner-produced video" OR "learner-made video" OR "learner-developed video" OR "learner-authored video") AND ("assess*" OR "learn* outcome" OR "learn* effect*" OR "performanc*" OR "achiev*" OR "impact*"). After screening and selecting relevant articles, the review synthesized findings from studies indexed in ERIC and Web of Science that met the

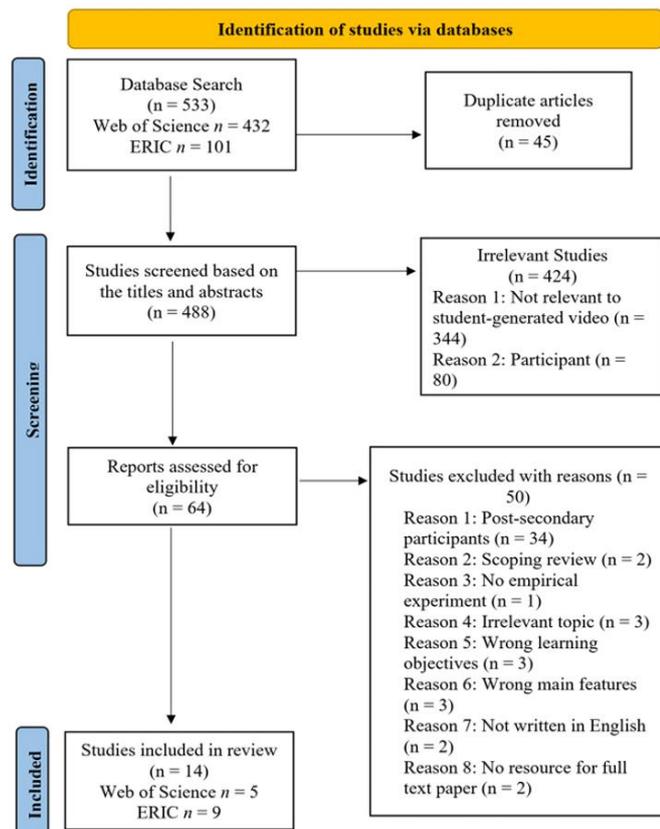


Figure 1. PRISMA flowchart of study selection (Page et al., 2021, PRISMA 2020 Statement, licensed under CC BY 4.0)

inclusion criteria. While ERIC and Web of Science are core databases in education, this search strategy may have omitted relevant studies indexed in other databases or published in languages other than English.

As shown in the PRISMA chart (see [Figure 1](#)), the peer-reviewed studies included in this review met the following criteria:

- presented experimental, quasi-experimental, or empirical data,
- involved students from primary to high school,
- incorporated pedagogical approaches using SGVs,
- examined educational outcomes associated with SGVs,
- published in English, and
- published between 2015 and 2024.

The year 2015 was chosen as the starting point due to significant technological advancements that improved the feasibility of high-quality student-generated content (Vonderau, 2016) and highlighted the growing prominence of video-based platforms. Exclusion criteria included secondary resources (e.g., meta-analyses, systematic reviews, and non-empirical studies) and articles without full-text availability.

The initial search retrieved 533 studies. After removing duplicates ($n = 45$), 488 abstracts were screened, leading to the exclusion of 424 articles for irrelevance or non-K-12 focus. Sixty-four articles proceeded to full-text review; 50 were excluded for reasons such as

- participants outside the defined age range,
- ineligible study design,

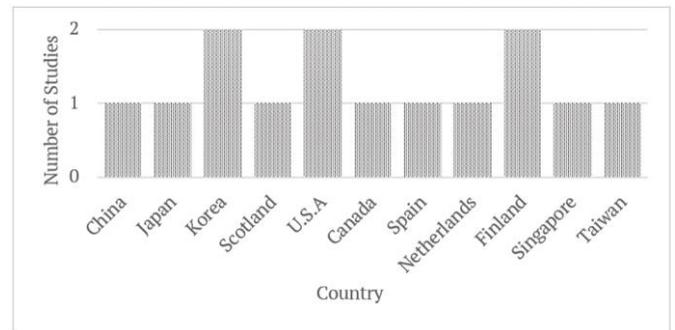


Figure 2. Distribution of studies by country (Source: Authors' own elaboration)

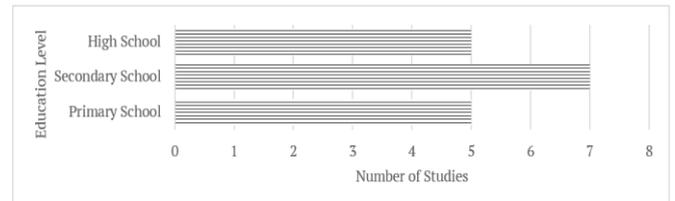


Figure 3. Number of studies by educational level (Source: Authors' own elaboration)

- lack of pre-/post-analysis on learning outcomes,
- not published in English, and
- inaccessible full text.

Data searching and extraction were conducted systematically to ensure consistency and accuracy. A detailed extraction protocol was applied, including piloting forms for reliability and independent data extraction by both authors. Discrepancies were resolved through discussion. Extracted data included study characteristics, participant demographics, interventions, outcomes, and other relevant variables.

Ultimately, 14 studies met the inclusion criteria (see [Figure 1](#)). Of these, 2 used qualitative methods, 8 applied mixed methods, and 4 were quantitative. Studies were conducted across various countries: China ($n = 1$), Japan ($n = 1$), Korea ($n = 2$), Scotland ($n = 1$), USA ($n = 2$), Canada ($n = 1$), Spain ($n = 1$), Netherlands ($n = 1$), Finland ($n = 2$), Singapore ($n = 1$), and Taiwan ($n = 1$) (see [Figure 2](#)). Sample sizes ranged from 6 to 319, covering participants from primary school through grade 11.

To address inconsistencies in grade categorization across regions (e.g., grade 8 considered secondary in some Asian countries but elementary in Ontario), this review defined grade levels as follows:

- primary: K-6,
- secondary: grade 7-grade 9, and
- high school: grade 10-grade 12.

Based on this classification, the studies were distributed as: primary ($n = 5$), secondary ($n = 7$), and high school ($n = 5$) (see [Figure 3](#)).

Two studies including Gold et al. (2015) and Niemi and Multisilta (2016) involved mixed-age cohorts and were counted in multiple categories (total settings = 17, exceeding the 14 included articles). These mixed-age studies were synthesized separately for overall effects but excluded from

Table 1. Coding process

10 themes	16 axial codes	42 open codes	Definitions
Engagement boost (deductive)	Student engagement & interest	Science interest in science, interest-driven learning, public engagement	Increased motivation and participation through interest-driven, science-oriented, or public-facing video tasks
	Role of SGVs	SGVs for motivation, SGVs for understanding, SGVs for interactive learning	Videos enhancing motivation, conceptual understanding, and interactive learning
Confidence growth (deductive)	Role of self-efficacy: confidence growth	Confidence through ownership, confidence through empowerment, confidence through active engagement	Growth in confidence through creative ownership, empowerment, and active participation
Collaborative problem-solving (deductive)	Collaborative learning	Teamwork, virtual collaboration	Coordinated teamwork and cross-context collaboration in planning and producing videos
Digital literacy through video-making (deductive)	Digital creation	Digital storytelling, multimedia composition	Development of skills in narrative construction and multimedia composition
	Technology-enhanced learning	Mobile technologies, digital literacy, multimodal literacy	Use of mobile technologies, digital tools and multimodal resources to support learning
Assessment impact (deductive)	Video-based assessment	Formative-, summative-, peer-, self-, reflective-, learning- assessment	Videos functioning as diverse forms of assessment and performance evidence
	Assessing conceptual understanding	Assessing conceptual understanding	Assessing gains in conceptual knowledge through video creation
Innovation & creative empowerment (deductive)	Creativity & innovation	Creativity and innovation	Enhanced creativity and innovative thinking in video production
	Inquiry & authentic learning	Inquiry-based, authentic, cognitive apprenticeship	Structured inquiry, authentic tasks, and scaffolding that support video creation
Instructional strategies & scaffolding (inductive)	Feedback & reflection	Corrective feedback, reflective videos, formal-, informal-review	Feedback and reflective practices integrated into video-based learning
	Teacher support	Teacher role, mentorship	Instructor guidance shaping student learning
Challenges & barriers (inductive)	Challenges & autonomy	Autonomy, information search, science learning challenges	Barriers related to digital skills, autonomy, and task demands
Changing roles (inductive)	Students as teachers	Students as teachers	Students producing instructional videos to teach peers and enhance their own learning
Learning domain impacts (inductive)	Language learning	Pronunciation, vocabulary	Improvements in pronunciation and vocabulary through video tasks
	Domain-specific learning	Linguistics, science, mathematics	Video-supported subject learning gains

age-specific comparisons. To rigorously address research question 1 on age-specific impacts, the stratified analysis focused exclusively on the 12 studies with discrete educational levels.

Thematic analysis is a qualitative research method that offers a flexible and accessible framework for analyzing qualitative data (Proudfoot, 2023) to identify emergent themes, providing richer qualitative insights (Saldaña, 2009). The initial phase of thematic analysis involved open coding, entailing the categorization of meaningful units such as individual words or short phrases by linking them with conceptual labels and annotations (Flick, 2014). As indicated in **Table 1**, during open coding, we assigned 42 codes directly to data extracted from our 14 included textual sources (Mishra & Dey, 2022). Axial coding followed open coding to clarify, reorganize, and integrate initial codes into 16 coherent categories (Williams & Moser, 2019), forming the basis for selective coding. We applied a combined deductive-inductive

framework for thematic analysis: the deductive (top-down) approach drew on active learning and multiliteracies to guide interpretation, while the inductive (bottom-up) approach minimized preconceptions and allowed patterns to emerge from the data (Creswell, 1998; Creswell & Plano Clark, 2007). This integration produced ten themes: engagement boost (deductive), confidence growth (deductive), collaborative problem-solving (deductive), digital literacy (deductive), assessment impact (deductive), innovation & creative empowerment (deductive), instructional strategies & scaffolding (inductive), challenges & barriers (inductive), changing roles (inductive), and learning domain impacts (inductive).

Following open coding, axial coding involved clarifying, reorganizing, and integrating the initial codes into coherent and structured categories (Williams & Moser, 2019) producing 16 axial codes. This process refined and classified the data into thematic groups, laying the groundwork for selective coding.

We employed a combined deductive-inductive framework in our thematic analysis. The deductive, top-down approach drew on theoretical constructs from active learning and multiliteracies to guide interpretation, while the inductive, bottom-up approach minimized preconceptions and allowed patterns to emerge directly from the data (Creswell, 1998; Creswell & Plano Clark, 2007). Together, these approaches enabled a comprehensive exploration of the research phenomena, integrating theory-driven and data-driven insights, and resulted in the identification of the following 10 themes: *engagement boost* (deductive), *confidence growth* (deductive), *collaborative problem-solving* (deductive), *digital literacy* (deductive), *assessment impact* (deductive), *innovation & creative empowerment* (deductive), *instructional strategies & scaffolding* (inductive), *challenges & barriers* (inductive), *changing roles* (inductive), and *learning domain impacts* (inductive).

FINDINGS

Impacts of SGV Assessments on Learning Outcomes Across K-12

Primary students (K-6)

The effect of SGVs on primary school students' learning outcomes was investigated in five studies. Outcomes examined included conceptual understanding (Ribosa & Duran, 2024), digital literacy (Niemi & Multisilta, 2016; Penttilä et al., 2016), motivation (Huang et al., 2020; Niemi & Multisilta, 2016; Penttilä et al., 2016), engagement (Niemi & Multisilta, 2016), and knowledge consolidation (Ribosa & Duran, 2024).

Studies such as Ribosa and Duran (2024) highlighted that the process of video creation enhances Grade 6 learners' understanding of scientific concepts related to the universe, nature, and human beings by requiring them to articulate explanations clearly. In one project, 44 sixth-grade students participated in 'Bikos,' which aimed to develop self-regulated learning, digital competence, and the ability to process and manage scientific information, such as the origin of the universe. At the conclusion of the project, students created videos to teach their peers, and 42 students reported substantial learning gains through this learning-by-teaching approach.

A total of three studies specifically examined the role of SGVs in fostering digital literacy. Penttilä et al. (2016) suggested that video production supports early engagement with digital tools, enhancing primary students' ability to navigate multimedia learning platforms. Similarly, Niemi and Multisilta (2016) emphasized creating and sharing stories via digital platforms, such as the mobile video experience (MoViE) platform, promotes 21st century skills, knowledge creation, and digital competence.

Motivation and engagement are often intertwined. Four studies explored these outcomes experimentally. For example, Ribosa and David (2024) reported that most of the 44 sixth grade students valued creating tutorial videos to teach peers, which promoted both motivation and engagement in learning scientific concepts such as snow formation. Penttilä et al.

(2016) found that incorporating film production into assignments on chemical reactions increased both task challenge and enjoyment, enhancing motivation and resulting in higher-quality outputs.

Regarding knowledge consolidation, students constructing a superball through a chemical reaction used mind maps in conjunction with digital storytelling, effectively consolidating conceptual understanding (Ribosa & David, 2024). This process not only deepened comprehension but also strengthened memory of the concepts. Despite generally positive outcomes, some studies noted that primary students may require additional scaffolding to ensure the videos remain educational rather than purely recreational. In a study with 21 grade 5 students, some less participative students were able to engage in collaborative problem-solving when supported by social interactions within the group (Huang et al., 2020). Teacher guidance further increased students' confidence in completing video tasks, whether filming or engaging with digital devices, and enhanced motivation to participate.

Secondary students (grade 7-grade 9)

Among the included studies, seven focused on secondary students, though Niemi and Multisilta (2016) and Gold (2015) also included some primary or high school participants. These studies explored the impact of SGVs as an assessment tool on various outcomes, including critical thinking (Shadiev et al., 2022), problem-solving (Shadiev et al., 2022; Z. Zhang et al., 2020), communication skills (Downie et al., 2017; Shadiev et al., 2022), and engagement (Bokhorst-Heng & Marchall, 2020; Gold et al., 2015; LópezLeiva et al., 2022; Niemi & Multisilta, 2016).

Gold et al. (2015) demonstrated that SGV projects foster critical thinking in secondary students. In the lens on climate change (LOCC) program, students conducted research, interviewed experts, and synthesized information into climate-focused documentaries. Preparing for interviews required deep understanding and thoughtful question design, which engaged students in analysis and synthesis. The study concluded that such video production tasks promoted higher-order thinking and reflection, especially when students presented their work in authentic, community-based contexts.

Similarly, Shadiev et al. (2022) examined Chinese secondary students using 360-degree video to create virtual panoramic tours for their Indonesian peers. This innovative approach provided opportunities to leverage new technologies while addressing real-world challenges, such as sharing cultural content across geographical distances. Another experiment involved assigning problem-solving tasks in a digital environment, followed by the development of algorithmic models to automatically evaluate and categorize students' creativity. This activity engaged students in digital creative problem-solving while enabling computational assessment of their outputs.

Shadiev et al. (2022) also reported that students engaged in video production improved communication skills and collaborative problem-solving, as they needed to articulate their learning clearly. Reviewing videos in formal settings, coupled with structured observation tools and feedback, further enhanced communication abilities. In addition, Bokhorst-Heng and Marshall (2020) observed that eighth-

grade students exhibited increased engagement when projects allowed them to select topics aligned with personal interests and cultural backgrounds. This student-centered approach significantly enhanced motivation, involvement, and emotional investment in classroom activities. Moreover, LópezLeiva et al. (2022) investigated Latinx secondary students' experiences in an extracurricular program integrating mathematics and computer programming. In this context, students transitioned from learners to facilitators, leading peer groups through the creation of instructional videos. This role shifts notably elevated engagement, as reflected in active and enthusiastic participation.

However, the effectiveness of video-based assessment varied based on student autonomy and teacher support. Several studies indicated that students with low self-regulation skills struggled with the open-ended nature of video projects, highlighting the need for additional instructional guidance. For example, some students required teacher assistance for technical issues, such as video-editing tools and task management (Shadiev et al., 2022).

High school students (grade 10-grade 12)

In high school, SGVs as an assessment method have the strongest impact on self-efficacy (Downie et al., 2017; Gold et al., 2015; Kang & Kim, 2024), knowledge consolidation (Gold et al., 2015; Kim et al., 2021), and the development of transferable skills (Gold et al., 2015; Kang & Kim, 2024).

For self-efficacy, Gold et al. (2015) reported that students engaged in a six-month climate video project gained confidence by overcoming production challenges and presenting their work publicly. One student reflected that the experience taught them to "be confident with myself" (p. 241) after initially considering dropping out. Similarly, Downie et al. (2017) found that students' pride in creating physics experiment videos (e.g., demonstrating optical fiber concepts) strongly correlated with increased motivation to pursue science, suggesting that successful video production supports academic confidence. Kang and Kim (2024) also observed that tenth-grade students with greater narrative and technical confidence produced higher-quality self-introduction videos, fostering the link between digital storytelling and self-efficacy.

Kang and Kim (2024) further found that Grade 10 students producing instructional videos gained confidence in their ability to communicate knowledge effectively. The process of researching, scripting, and editing videos required deep content mastery, which supported improved long-term learning of subject matter. Moreover, students acquired valuable skills in digital content creation, video editing, and public speaking as competencies that are highly transferable to academic and professional settings. Gold et al. (2015) additionally noted that over half of the participating secondary and high school students had no prior exposure to college environments or direct interaction with scientists. After collaborating with college students and undergraduates, they not only developed videography skills but also enhanced teamwork and leadership abilities. Compared to traditional assessment methods, video projects provided a more comprehensive platform for demonstrating understanding, supporting learning outcomes. However, some studies caution

that without clear guidelines, students may prioritize aesthetics over content depth (Gold et al., 2015). For instance, when students targeted peers rather than teachers as their intended audience, they often emphasized visual appeal over conceptual rigor.

Across educational stages, common outcomes of SGV assessments include increased motivation (Gold et al., 2015; Niemi & Multisilta, 2016; Ribosa & Duran, 2024), engagement (Bokhorst-Heng & Marshall, 2020; Gold et al., 2015; LópezLeiva et al., 2022), and active learning (Gold et al., 2015; Kang & Kim, 2024). Students consistently demonstrate greater enthusiasm when creating videos compared to completing traditional assessments. Nevertheless, these benefits depend on structured instructional design, teacher support, and access to adequate technological resources (Gold et al., 2015; Kang & Kim, 2024; Ribosa & Duran, 2024). Without these conditions, students may focus on superficial aspects such as aesthetics rather than deep learning.

Despite these similarities, impacts vary by educational level. At the primary level, video assessments primarily enhance digital literacy (Niemi & Multisilta, 2016; Penttilä et al., 2016), basic conceptual understanding (Ribosa & Duran, 2024), and require substantial teacher scaffolding (Huang et al., 2020). At the secondary level, students develop higher-order skills such as critical thinking (Gold et al., 2015), problem-solving (Z. Zhang et al., 2020), and communication (Downie et al., 2017; Shadiev et al., 2022), benefiting from targeted teacher facilitation and peer collaboration (LópezLeiva et al., 2022; Shadiev et al., 2022). At the high school level, video projects most strongly influence self-efficacy (Gold et al., 2015; Kang & Kim, 2024), long-term learning (Kim et al., 2021), and transferable skills such as teamwork, leadership, and public speaking (Gold et al., 2015; Kang & Kim, 2024). These older students work with more analytically complex content, requiring greater autonomy and sophisticated instructional supports to balance technical and academic rigor.

Ultimately, the success of SGVs as an assessment method hinges on thoughtful instructional design, adequate technological access, and responsive teacher guidance. For example, Ribosa and Duran (2024) emphasized the need for structured social scaffolding at the primary level, while at the high school level, clear assessment criteria and technical assistance are essential to maintaining academic rigor (Gold et al., 2015; Kang & Kim, 2024). These findings underscore the importance of adapting video-based assessments to the developmental needs and capabilities of each educational stage.

Factors Influencing the Effectiveness of SGV Assessments in Diverse Educational Settings

The effectiveness of SGV assessments is shaped by several key factors, including the educational setting, student autonomy, teacher guidance, and access to technology (Gold et al., 2015; Kang & Kim, 2024). In formal classroom settings, structured teacher guidance and clear expectations are critical for keeping students focused on the educational objectives of the video project. Studies indicate that students benefit from direct support in managing both technical and content-related aspects of video production. For example, Gwee and Toh-Heng

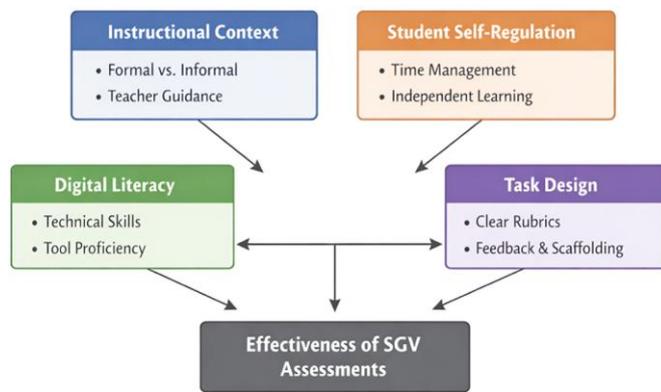


Figure 4. Influencing factors (Source: Authors' own elaboration)

(2015) found that students who reviewed their own video presentations under teacher supervision produced more cohesive and effective oral presentations than those working independently.

In contrast, informal learning environments place greater emphasis on student autonomy. Wong and Shintani (2021) highlighted that self-directed learning allows fifth-grade students to engage in iterative self-assessment, fostering continuous improvement. However, this approach requires high levels of self-regulation, as students must independently manage their time and video production process. Primary students with lower self-regulation may struggle to fully utilize opportunities for iterative learning and self-reflection. Ribosa and Duran (2024) observed that sixth-grade students who faced difficulties in information retrieval, voice-over recording, and technical operations often had to engage in conscious regulation throughout the process, which could also result in frustration.

Technological proficiency is another critical factor influencing success. In both formal and informal settings, students' digital literacy directly affects the quality of their video output. Kang and Kim (2024) demonstrated that tenth-grade students with higher digital literacy produced more multimodal, well-structured videos, effectively integrating visuals, narration, and text. Students with lower familiarity with video tools may struggle to balance content mastery with technical demands, often underestimating the time required for editing (Gold et al., 2015). Providing adequate technological resources and training is therefore essential.

The design of the video assessment task also plays a central role. Clear and comprehensive rubrics significantly influence the quality of final products. When students are given detailed guidelines regarding content accuracy, structure, and multimodal design, they are more likely to produce high-quality videos. Gold et al. (2015) found that well-designed tasks can also promote transferable skills, including project management, digital communication, and collaborative problem-solving among secondary and high school students. Incorporating peer feedback and self-reflection opportunities further enables students to identify areas for improvement and refine their work.

In summary, the effectiveness of SGV assessments depends on a combination of instructional context, student self-regulation, digital literacy, and thoughtful task design as

shown in **Figure 4**. Formal classroom settings benefit from structured guidance to support both content and technical execution, while informal settings place greater demands on student autonomy and self-regulation, which can be both empowering and challenging (Wong & Shintani, 2021). For example, younger students may struggle to manage time and technical tasks independently, leading to frustration if adequate scaffolds are not provided (Ribosa & Duran, 2024).

Equally important is students' digital literacy, which directly affects the multimodal quality and communicative clarity of the final product (Kim et al., 2021). Students with stronger digital literacy are more likely to produce cohesive and engaging videos that effectively integrate visual, textual, and auditory elements. Additionally, ensuring technological proficiency and providing clear assessment rubrics can significantly enhance the quality of SGV assessments across learning environments. When supported with contextualized tools such as ReflectionScope, students can engage in reflective practices that improve both technical and cognitive aspects of video creation (Z. Zhang et al., 2020). Overall, the success of SGV assessments depends on the interplay of instructional context, student self-regulation, digital literacy, and thoughtfully designed tasks.

The Role of Self-Efficacy in Student Performance on Video-Based Assessments

Self-efficacy, or a student's belief in their ability to successfully complete a task, plays a critical role in creating and effectively using SGVs for learning. Research consistently shows that higher self-efficacy promotes greater motivation, persistence, and engagement in video production tasks, ultimately enhancing learning outcomes (Ariza, 2023; Bandura, 1986).

Students with high self-efficacy approach video creation as an opportunity for knowledge construction rather than as a daunting task. For example, Huang et al. (2020) asked secondary students to create tutorial videos explaining mathematical concepts over a four-week intervention. Students with higher self-efficacy exhibited lower anxiety, greater engagement, and stronger problem-solving abilities, demonstrating that confidence in video-making can translate into deeper academic understanding.

Self-efficacy also fosters creativity and higher-order thinking. Kang and Kim (2024) studied 48 Korean high school students who produced self-introduction storytelling videos using the mobile application KineMaster. Students with higher self-efficacy engaged more with advanced editing techniques, multimodal storytelling, and structured narratives, resulting in higher-quality videos and improved language learning outcomes. These findings indicate that confidence not only enhances enjoyment but also leads to more meaningful and pedagogically sound content.

Additionally, self-efficacy influences how students benefit from iterative learning processes, such as reviewing and refining their videos. Gwee and Toh-Heng (2015) examined Grade 11 students in Singapore participating in an eight-week video-based oral presentation assessment. Students who believed in their ability to improve were more likely to critically analyze their performances, incorporate feedback, and make meaningful revisions, demonstrating higher fluency

and audience awareness compared to peers with lower self-efficacy. Conversely, students with low self-efficacy are more prone to anxiety, procrastination, and surface-level engagement. Huang et al. (2020) reported that some elementary students creating mathematics tutorial videos felt embarrassed or nervous when presenting to peers, leading to reduced engagement and lower-quality outputs.

In conclusion, self-efficacy is fundamental in determining how effectively students engage with SGV learning. It shapes confidence, perseverance, creativity, and the willingness to refine work, all contributing to higher-quality video outputs and improved academic outcomes. By integrating scaffolding strategies that build self-efficacy, educators can maximize the educational value of SGV as both an assessment and learning tool.

Instructional Strategies to Strengthen Self-Efficacy in SGV Assessments

Providing structured guidance and cognitive scaffolding is essential for enhancing self-efficacy in video-based learning environments. Huang et al. (2020) conducted a four-week intervention with secondary students tasked with creating mathematics tutorial videos and found that clear instructional support increased students' confidence in both video production and mathematical problem-solving, underscoring the importance of scaffolding in self-directed learning.

Encouraging peer collaboration and social learning further strengthens self-efficacy by allowing students to learn in a supportive environment. For instance, Ribosa and Duran (2024) implemented the Bikos Project, where sixth-grade students worked in pairs to create educational video tutorials. Over several weeks, students exchanged knowledge, offered peer feedback, and co-created video content, leading to higher confidence and engagement. This aligns with constructivist principles emphasizing active knowledge construction through collaboration and interaction.

Framing video creation as a process rather than a final product also fosters resilience and a growth mindset, which enhance self-efficacy. Kang and Kim (2024) studied 48 Korean high school students producing self-introduction storytelling videos and found that students who viewed video-making as an iterative skill rather than a one-time task experienced less anxiety, greater engagement, and more willingness to experiment, resulting in higher-quality outputs and increased confidence.

By integrating scaffolding (Huang et al., 2020), peer collaboration (Ribosa & Duran, 2024), iterative feedback (Kang & Kim, 2024), and growth mindset practices (Huang et al., 2020; Penttilä et al., 2016), educators can create supportive video-based learning environments that enhance students' confidence, motivation, and engagement. These strategies not only strengthen self-efficacy but also contribute to deeper learning and improved educational outcomes in SGV projects.

Transferable Skills Developed Through SGV Assessments

Creating SGVs extends beyond subject-specific learning to cultivate a wide range of transferable skills that are applicable across academic, personal, and professional contexts. These include communication (Huang et al., 2020; Ribosa & Duran, 2024), collaborative problem-solving (Gold et al., 2015), digital

literacy (Gold et al., 2015; Kang & Kim, 2024), critical thinking (Ribosa & Duran, 2024; Shadiev et al., 2022), project management (Gold et al., 2015), and creative problem-solving (Huang et al., 2020; Kang & Kim, 2024).

Communication is among the most frequently reported transferable skills, particularly in presentation, storytelling, and audience awareness. In the Bikos Project, Ribosa and Duran (2024) observed that sixth-grade students developed abilities in structuring explanations, formulating audience-directed questions, and using visuals to support narration, contributing to improved science communication and literacy. Similarly, Huang et al. (2020) reported that creating mathematics tutorial videos required students to verbally explain abstract concepts, strengthening both conceptual understanding and communication clarity. Collaborative problem-solving also emerges as a key competency in group-based video production tasks. In the LOCC program, students from eight secondary and high schools in Colorado collaborated on climate-related documentaries over six months (Gold et al., 2015). The process involved dividing responsibilities, negotiating roles, co-authoring scripts, and offering peer feedback, which fostered collaboration and shared accountability for learning outcomes.

Another significant outcome is digital literacy. Students learn to plan storyboards, operate cameras, edit footage, and apply visual storytelling techniques. For instance, the LOCC project documented students' technical skill development in filming, audio production, editing, and integrating multimedia elements, while adhering to copyright and digital ethics (Gold et al., 2015). Students also strengthened media and information literacy through critical evaluation of their own and others' productions. Such research skills were enhanced during the preparation of instructional videos (Shadiev et al., 2022). In the Bikos Project, students engaged in question formulation, online research, and fact-checking, supported by scaffolding for inquiry-based learning (Ribosa & Duran, 2024). These activities fostered scientific literacy and the ability to assess the credibility of information sources as crucial competencies in today's digital environment.

Project management and organizational skills were also widely reported. Producing a coherent video required planning timelines, coordinating roles, and adhering to deadlines. In the LOCC project, teachers observed that students became more autonomous and goal-oriented when given ownership of topic selection and production processes (Gold et al., 2015). Finally, video production promotes higher-order thinking, including analysis, synthesis, and creative problem-solving. Huang et al. (2020) found that breaking down complex mathematical concepts into video explanations required students to reframe and internalize knowledge beyond rote memorization. Similarly, narrative and aesthetic decisions in video design demonstrate critical thinking and innovation.

In summary, creating SGVs engages learners in a multifaceted process that goes far beyond content mastery. It develops essential 21st century competencies including communication, collaborative problem solving, digital literacy, research skills, project management, and critical thinking, preparing students for academic achievement, lifelong learning, and active participation in a digitally mediated society.

DISCUSSION

Our systematic review synthesized existing evidence regarding the effectiveness of SGVs as an assessment tool in K-12 education. Drawing on 14 empirical studies published between 2015 and 2024, the findings confirm that SGVs positively influence a range of cognitive and non-cognitive learning outcomes, aligning with active learning and multiliteracies that emphasize authentic engagement and student agency (Cooperstein & Kocevar-Weidinger, 2004; Mintzes, 2020). The results expand upon prior research by illustrating how these outcomes manifest differently across primary, secondary, and high school levels, and by identifying critical mediating factors such as teacher scaffolding, instructional design, and digital literacy.

The findings underscore that SGVs foster multiple dimensions of student learning. First, they enhance motivation and engagement, largely attributable to the creative, interactive nature of video production (Niemi & Multisilta, 2016). Students demonstrate higher levels of interest and ownership when tasked with producing videos compared to traditional assessments. Second, SGVs support the development of transferable skills essential for 21st century learning, including digital literacy, communication, creativity, collaboration, and critical thinking. These competencies are not merely by-products but integral to the process of creating videos, which requires students to synthesize information, plan narratives, and employ multimodal strategies to convey meaning effectively.

Notably, the impact of SGVs varies by educational stage. In primary education, SGVs contribute to improved conceptual understanding and digital familiarity but demand substantial teacher scaffolding (Ribosa & Duran, 2024). Younger students often face challenges related to task complexity and time management, and without structured guidance, these difficulties may lead to frustration and diminished learning outcomes (Huang et al., 2020; Penttilä et al., 2016). In contrast, secondary students exhibit significant gains in collaborative problem-solving and critical thinking when SGV tasks are designed with clear objectives and group-based structures (Gold et al., 2015; Shadiev et al., 2021). High school students, equipped with more advanced cognitive and technological skills, tend to experience the most substantial benefits, including heightened self-efficacy, greater autonomy, and increased content retention (Gold et al., 2015; Kang & Kim, 2024; Wong & Shintani, 2021). These developmental distinctions highlight the necessity for differentiated instructional approaches tailored to students' age, cognitive development, and digital competence.

While SGVs present clear pedagogical benefits, the review also reveals important implementation challenges. Chief among these is the issue of equity. Several studies (Gwee & Toh-Heng, 2015; Kang & Kim, 2024; Ribosa & Duran, 2024; Shadiev et al., 2022) indicate that students from under-resourced contexts or with limited digital literacy face disproportionate difficulties in producing high-quality videos. Tasks such as filming, editing, and uploading require not only access to devices and software but also proficiency in digital storytelling (Kang and Kim, 2024). Without adequate resources

and targeted support, these students risk being marginalized, reinforcing the digital divide in education. Addressing these disparities is essential to ensure that SGVs function as inclusive assessment practices (Liasidou, 2023; Yu & Yu, 2021). The Multiliteracies framework proposed by the New London Group (1996) provides a useful lens for understanding these equity-related challenges. It emphasizes equitable access to diverse modes of meaning-making and views learners as active designers of meaning, shaped by their sociocultural and material contexts.

Another critical finding pertains to the role of instructional design and teacher support. Effective SGV implementation depends on clearly articulated expectations, structured rubrics, and timely formative feedback (Gold et al., 2015). In the absence of these elements, students may overemphasize the aesthetic aspects of video production at the expense of academic rigor. Teachers, therefore, require professional development that equips them with the skills to design meaningful video-based tasks, manage group dynamics, and integrate reflective activities that deepen learning. In addition to student- and resource-related challenges, SGV assessments can place a significant burden on teachers, as reviewing videos and providing meaningful, multimodal feedback can be time-consuming, especially in large classes or resource-limited settings. This review also highlights the value of feedback and iterative improvement processes, which not only enhance the quality of student work but also cultivate metacognitive skills and self-regulation (Altok et al., 2019; Gwee & Toh-Heng, 2015; Z. Zhang et al., 2020).

Implications, Significance, and Limitations

This study highlights the potential of SGVs as an intentional pedagogical approach that promotes both cognitive and non-cognitive learning outcomes that traditional assessments often fail to capture. Teachers require training in scaffolding, collaboration support, and feedback aligned with learning objectives, while reflection and peer review should be integrated to strengthen self-regulation. Furthermore, curriculum frameworks should explicitly incorporate SGV-based assessments as part of broader efforts to align education with the competencies required in digitally mediated environments. At the policy level, the institutionalization of SGVs as an assessment strategy necessitates systemic support.

The findings are significant in demonstrating how SGVs can foster both cognitive and non-cognitive competencies, providing empirical evidence to inform curriculum design and digital assessment strategies. However, several limitations must be acknowledged. Most studies reviewed are short-term and limited to single instructional units, leaving questions about the sustained impact of SGVs. Evidence on equity, teacher readiness, and large-scale implementation is also sparse, limiting generalizability across diverse contexts. Future research should explore longitudinal mixed-methods studies to track the sustainability of transferable skills and self-efficacy gains, comparative effectiveness with other alternative assessments, equity issues, teacher practices, and design-based research collaborations with schools to develop and iteratively test feasible SGV assessment frameworks for broader curriculum integration.

CONCLUSION

SGVs show strong potential for advancing 21st century learning, provided they are supported by purposeful instructional design, sustained teacher support, and equitable access to resources. This systematic review addressed five guiding questions. First, SGV assessments enhance learning outcomes across K-12, including digital literacy, critical thinking, collaborative problem-solving, and conceptual understanding, with younger students requiring more scaffolding and older students achieving higher cognitive gains. Second, effectiveness is shaped by such as teacher guidance, peer collaboration, technology access, and clear assessment criteria. Third, self-efficacy plays a pivotal role, as students with greater confidence engage more deeply, while those with lower confidence need targeted support. Fourth, instructional strategies such as scaffolding and formative feedback strengthen self-efficacy, enabling students to complete tasks successfully and express their understanding creatively. Finally, SGV assessments help students develop transferable skills that extend beyond academic outcomes and support active learning across diverse K-12 settings. Taken together, these insights indicate that SGVs can move beyond isolated classroom projects to become meaningful and sustainable components of assessment practice.

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APPENDIX

Table A1. Studies included in the systematic review

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