Review

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Challenging the Myth of the Digital Native: A Narrative Review

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Abstract: Background and Aims: Nurses are increasingly engaging with digital technologies to enhance safe, evidence-based patient care. Digital literacy is now considered a foundational skill and an integral requirement for lifelong learning, and includes the ability to search efficiently, critique information and recognise the inherent risk of bias in information sources. However, at many universities, digital literacy is assumed. In part, this can be linked to the concept of the *Digital Native*, a term first coined in 2001 by the US author Marc Prensky, to describe young people born after 1980 who have been surrounded by mobile phones, computers, and other digital devices their entire lives. The objective of this paper is to explore the concept of the Digital Native and how this influences undergraduate nursing education. Materials and Methods: A pragmatic approach has been used for this narrative review, working forward from Prensky's definition of the Digital Native and backward from contemporary sources of information extracted from published health, education, and nursing literature. Results: The findings from this narrative review will inform further understanding of digital literacy beliefs and how these influence undergraduate nursing education. Recommendations for enhancing the digital literacy of undergraduate nursing students are also discussed. Conclusions: Digital literacy is an essential requirement for undergraduate nursing students and nurses, and is linked with safe, evidence-based patient care. The myth of the Digital Native negates the reality that exposure to digital technologies does not equate with digital literacy and has resulted in deficits in nursing education programs. Digital literacy skills should be a part of undergraduate nursing curricula, and National Nursing Digital Literacy competencies for entry into practice as a Registered Nurse should be developed and contextualised to individual jurisdictions.

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1. Introduction

Digital literacy is considered one of the foundational literacies for learning. The World Economic Forum [1] (p.10) defines foundational literacies as representing how the individual applies "core skills to everyday tasks". "Digital literacy looks beyond functional IT (information technology) skills to describe a richer set of digital behaviours, practices and identities" [2] (n.p.) which change across contexts and time. Ng's [3,4] development of a digital literacy framework identified digital literacy as resulting from intersecting technical, cognitive and socio-emotional dimensions. *Technical dimensions* include technical skills to use digital technologies in everyday living and learning [3,4]. *Cognitive dimensions* require the ability to critique digital sources, evaluate the suitability of software programs and understand the ethical and legal implications of using digital sources [3,4]. And *socio-emotional dimensions* entail the responsible use of the internet and the promotion of safety and privacy [3,4]. Ng [3,4] asserts that underpinning these three dimensions is *critical literacy*, the ability to critically evaluate information with the understanding of the inherent bias in sources of information.

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Other models and frameworks of digital literacy have been proposed [5-7], but the overarching aim of developing digital competencies and lifelong learning skills in education remains of paramount importance [8].

However, many universities are yet to recognise digital literacy as an inherent part of the foundational literacies, with Murray & Perez [9] (p.850) noting that "at most universities, digital literacy is either taken for granted or assumed to be at an adequate level rather than being assessed, remediated and amplified". This deficit in digital literacy is further exacerbated by the disparity between institutional responses to digital literacy requirements [5] and the prevailing belief that students' increased exposure and use of technology correlates with digital literacy [9-11]. In part, these beliefs can be linked to the concept of the *Digital Native*, a term created by Prensky [12] (n.p.) to describe students who have grown up with digital technology and "think and process information fundamentally differently from their predecessors".

Since Prensky's seminal work [12] *Digital Natives, Digital Immigrants*, there has been debate over whether this presents a false dichotomy [10,13], that young people instinctively know how to use digital technologies, as opposed to *digital immigrants* who have been exposed to digital technologies later in life [12,14]. Debate has also centred around whether the ability to use mobile phones and other handheld devices equates with digital literacy and whether young people overestimate their digital competency [15]. Despite these arguments, the myth of the Digital Native is still evident in universities [3,14,16].

Therefore, this narrative review will examine the history of the Digital Native, the arguments for and against this terminology, and how these beliefs influence the digital literacy of undergraduate nursing students. Recommendations for enhancing the digital literacy of undergraduate nursing students are also discussed.

2. Materials and Methods

A pragmatic approach was used for this narrative review, working forward from Prensky's definition of the Digital Native and backward from contemporary sources of information extracted from published health, education, and nursing literature. "Narrative reviews describe published articles to inform debate, appraise research and identify gaps in current knowledge" [17] (p.109) and are the most common publications in medical literature [18,19]. "Narrative overviews are useful educational articles since they pull many pieces of information together into a readable format" and provide a broad perspective of a phenomenon of interest [20] (p.103). It is important to note that despite differing from the methodological requirements of a systematic review, narrative reviews remain systematic and are not an *ad hoc* review [21]. This review, undertaken as part of a PhD research study, identifies the history of the Digital Native, thereby adding to the body of knowledge regarding digital literacy and undergraduate nursing curricula.

2.1. Narrative review methodology

In response to the lack of a consistent narrative review methodology, Baethge et al. [18] developed the *Scale for the Assessment of Narrative Review Articles (SANRA)* which consists of six items: (1) Justification of the article's importance for the readership, (2) Statement of concrete/specific aims or formulation of questions, (3) Description of the literature search, (4) Referencing, (5) Scientific reasoning, and (6) Appropriate presentation of data (as listed in Appendix A). These items are discussed below and applied to this narrative review.

2.1.1. Item 1—Justification of the article's importance for the readership

Justification of the relevance and importance for the reader [18] is important, and in this instance, a coherent discussion on the history of the Digital Native is provided. In this review, the arguments for and against this terminology, and how these beliefs influence the digital literacy of undergraduate nursing students, are articulated accordingly.

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2.1.2. Item 2 – Statement of concrete/specific aims or formulation of questions

This requires a clear statement of the aims or questions of the review [18]. The aim of this review is to provide an analysis of the Digital Native debate and provide recommendations for enhancing the digital literacy of undergraduate nursing students.

2.1.3. Item 3 – Description of the literature search

Here, a clear and transparent description of the search strategy, including search terms and the types of literature included in the search is required; however, "it is not necessary to describe the literature search in as much detail as for a systematic review (searching multiple databases, including exact descriptions of search history, flowcharts etc.), but it is necessary to specify search terms, and the types of literature included" [18] (n.p.). A detailed description of the search strategy is described below.

Search strategy

A literature search of peer-reviewed and full-text articles, published in English, was conducted using the search terms '*education AND nursing'*, '*digital literacy'* and '*Digital Native'*. Additional search terms of '*Net generation'*, '*Generation Y'* and '*Google generation'* were then applied, as identified by the ECDL (European Computer Driving Licence) [15] in *The fallacy of the Digital Native*. Identified sources of information were included if they were published between January 2001 – January 2023 to reflect the period of time since the first use of the term *Digital Native*.

Database

ProQuest Central was searched to identify potentially relevant sources including scholarly journals, books, reports, conference papers and proceedings. A total of 4084 sources of evidence were identified. A snowball technique was employed, and 13 additional sources of information were obtained from the reference lists of selected sources. In total, 4097 sources of evidence were uploaded to Covidence, an online collaboration platform that facilitates the preparation of literature reviews, aids in the uploading of search results, the screening of abstracts and full text, completing data collection, review by two or more reviewers and exporting of data [22]. Following duplicate removal, 3837 sources of evidence progressed to the screening process.

Screening process

The screening process determined whether each source met the inclusion criteria of being peer-reviewed and available as a full-text article, describing Digital Natives (or equivalent definitions), digital literacy, undergraduate nursing education, published between January 2001 - January 2023, and published in English. The screening process involved *Title and abstract screening* and *Full-text screening*. 3837 sources of evidence progressed to *Title and abstract screening*. 367 sources of evidence progressed to *Full-text screening*. To arrive at a consensus, review meetings were held, and emails were exchanged between the researcher and the PhD supervisors. For visual reinforcement and to enhance the trustworthiness of the findings, a flowchart was developed to depict the phases of the screening process (see Figure 1).

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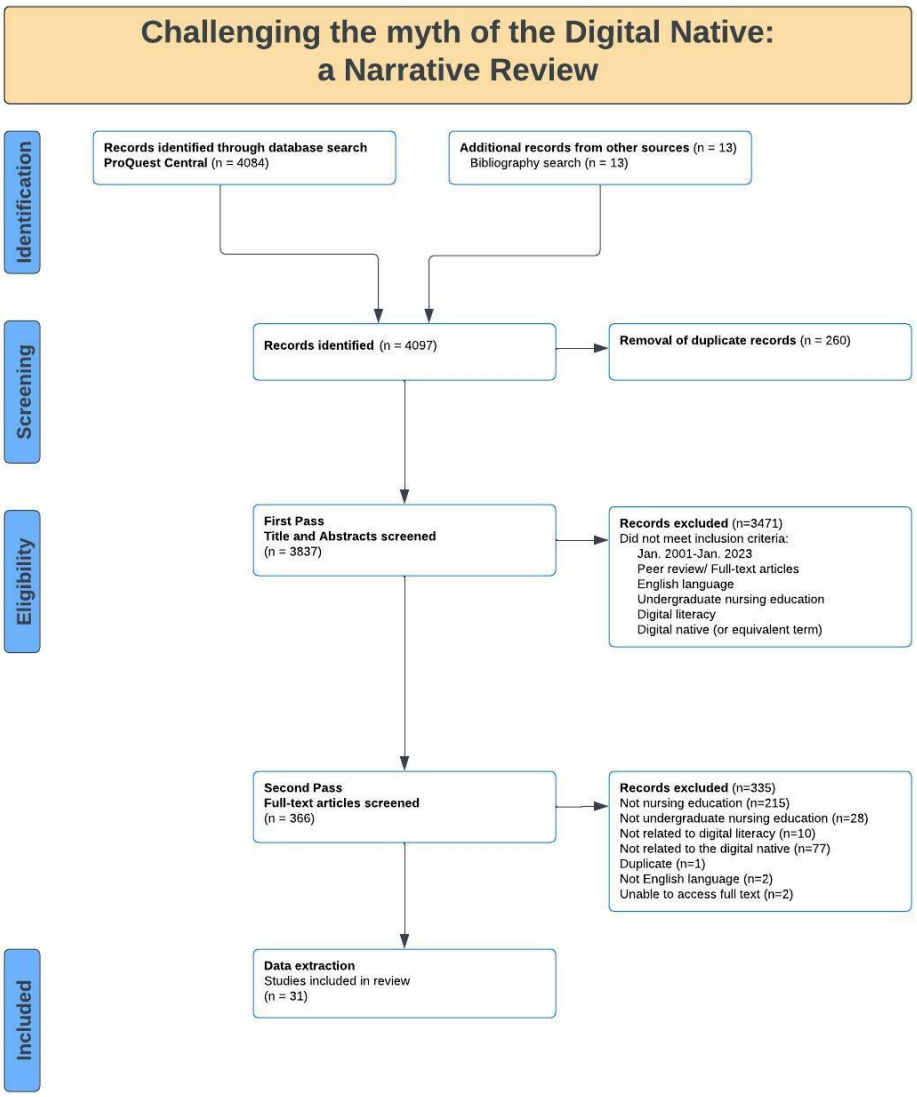

Figure 1. The reporting items for the screening processes used in this narrative review.

Data extraction

Following the completion of the screening process, 31 sources of evidence were moved to the *Data extraction* phase and a template was developed in Covidence with consultation between the researcher and the PhD supervisors. The template included the following headings: study details (title and authors), study settings, aim or purpose of study, study design, sampling procedure and synopsis of content related to inclusion criteria. The data extraction template was used in the *data analysis and synthesis* phase.

Data analysis and synthesis

The analysis and synthesis of data, in a narrative review, requires all of the information retrieved in the literature search to be synthesised into comprehensive paragraphs [20]. Green et al. [20] recommend the use of a clear and systematic approach that identifies the relevant content and provides a discussion of major areas of agreement and disagreement. The author's interpretation of selected sources of information should be provided with recommendations on the relevance of the findings [20]. The data analysis and synthesis with recommendations are provided in the *Results*, *Discussion* and *Recommendations* sections.

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2.1.4. Item 4 – Referencing

Comprehensive referencing, including evidence for all arguments stated in the review, supports validation of the trustworthiness of the findings [18]. Referencing of all sources used in this review is provided in the *References* section.

2.1.5. Item 5 – Scientific reasoning

This item requires evidence for arguments, study designs of selected sources of information and, where applicable, levels of evidence [18]. Evidence for arguments is provided in the *Results* section of this review.

2.1.6. Item 6 – Appropriate presentation of data

The final requirement is concerned with the correct presentation of data from selected sources of information [18]. Accordingly, appropriate conventions are applied to ensure data is presented clearly and comprehensively in this review.

3. Results

31 sources of evidence were selected following full-text screening and data extraction. The characteristics of these sources and their relevance to the inclusion criteria are described below.

3.1. Undergraduate nursing education

3.1.1. Definitions of undergraduate nursing students

To be included in this review, sources of evidence needed to include education for undergraduate nursing students in a Bachelor of Nursing program (or equivalent). The Australian Nursing and Midwifery Federation [23] define undergraduate nursing students as individuals enrolled within a recognised nursing program leading to registration as a Nurse. To meet the requirements for registration as a Registered Nurse, in Australia, individuals are required to complete a Bachelor of Nursing program at a university (Australian Qualifications Framework Level 7) as defined by the Australian Qualifications Framework Council [24,25]. For the purpose of this review, undergraduate nursing students were defined as those individuals undertaking a three-year Bachelor of Nursing program at a university. Equivalent definitions were also identified in the sources of evidence, including Bachelor of Science Nursing [26-28], nursing degree students [29], nursing students [30-33] baccalaureate nursing students [34,35] health professional students (including nursing) [36-38], undergraduate pre-registration nursing students [39], Generation Z, Net Generation or Millennial students (nursing) [40-44], undergraduate students (nursing) [45], university education (nursing) [46] and students (nursing) [47].

3.1.2. Use of digital technologies in undergraduate nursing education

In the sources of evidence, digital technologies used in undergraduate nursing education were explored. Cremin, [48] (p. 153), an eminent educational historian, defined education as "the deliberate, systematic, and sustained effort to transmit, evoke, or acquire knowledge, attitudes, values, skills, or sensibilities, as well as any outcomes of that effort". Digital technologies are "electronic tools, systems, devices and resources that generate, store or process data. Well known examples include social media, online games, multimedia and mobile phones" [49]. For the purpose of this review, digital technologies used in (or recommended for use in) undergraduate nursing education were identified and included computer-based or device-based applications [26-28,33,38,41,47,50-52], the internet [26,27,31-34,38,47,50-54], social media platforms [26,27,29,32,38,40,41,46,51], learning management systems [26,27,51], online videos [29,32,36,38,40,41], online learning [27,41,46], e-portfolios [26], electronic health records and medication records [27,50,52], clinical simulation [30,33,41-43,51,52,55,56], virtual learning

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environments [29,43,51], interactive gaming [29,30,40,42,51,55], lectures with response clickers [34,42,43], blogs [43] and wikis [43].

3.1.3. Faculty responses to digital technologies in undergraduate nursing education

Faculty knowledge has been identified as a barrier to the integration of digital technologies into undergraduate nursing curricula [57]. The knowledge, skills and attitude of nursing faculty regarding digital technologies were highlighted, in the sources of evidence, as contributing to a lack of technology usage in nursing education [27,28,37,42,43,47,50-52,55] and was attributed to a lack of professional development in the use of digital technologies [27,50], a lack of confidence when using digital technologies [37], a lack of understanding of the role of digital technologies in nursing care [50], tension between technology and human-based care [50] and adherence to traditional approaches [28,42,43,47,51,55]. However, the potential for faculty to respond to the challenges of digital technology usage, in undergraduate nursing curricula, was also identified, with recommendations for improving student engagement through embracing digital education strategies [27,29,30,32-34,37,40-43,47,50-53,55,56].

3.2. Digital literacy

Digital literacy has been defined as "the ability to use information and communication technologies to find, evaluate, create, and communicate information, requiring both technical and cognitive skills" [58]. "Digital literacy looks beyond functional IT skills to describe a richer set of digital behaviours, practices and identities. What it means to be digitally literate changes over time and across contexts, so digital literacies are essentially a set of academic and professional situated practices supported by diverse and changing technologies" [2]; however, there is no consensus on the definition [13].

3.2.1. Definitions and relevance of digital literacy

Throughout the sources of evidence, digital literacy was consistently identified as a critical component of success [28]. Some sources of evidence equated the increased exposure to digital technologies, as experienced by those born after 1980, as meeting digital literacy requirements [30,43,55,56,59]; however, caution against generalising about the digital literacy of a generation was identified [33,36,46]. It was also noted that access to information through electronic media, whilst often equated with digital literacy, has resulted in "a weakness in critical thinking and a lack of understanding of the differences between true, objective facts versus opinions" [34] (p.160), with those ill-prepared for the use of digital technologies being subject to reality shock as they enter the workforce [49]. Sub-sections of digital literacy, identified in the sources, included eHealth literacy [37,53], computer literacy [27], digital information literacy [60], communication literacy [27], online information literacy [54] and media literacy [38].

3.2.2. Development of digital literacy in undergraduate nursing education

The discussion of the development of undergraduate nursing students' digital literacy was noted to be limited in some of the sources of evidence. As previously illustrated, some authors made assumptions about generational differences and inherent digital literacy, and therefore subsequent development of digital literacy skills was not addressed. However, studies identified the importance of the promotion of critical thinking and clinical reasoning [29,30,32,36,37,40-42,47,51,53-55,60], the development of a professional digital identity [26] and the development of digital technology skills for the workforce [33,47,50,51].

3.3. The Digital Native

In 2001, Prensky [12] (n.p.) first used the phrase *Digital Native*, stating "Our students today are all 'native speakers' of the digital language of computers, video games and the Internet". In a subsequent publication, Prensky suggested that the brains of Digital Natives could also be

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physically different due to the input of digital technologies [61]. The concept of specific attributes of different generations and their engagement with digital technologies is not new [62], with Tapscott [63] identifying the *Net Generation* in 1998; however, Prensky's *Digital Native* gained traction, particularly in academia, and has been present in the literature and public discourse ever since [15].

3.3.1. Descriptions of the Digital Native

In a large proportion of the sources of evidence, the use of the term *Digital Native* [27-29,32-34,36,38,39,41-47,50,52-54,59,60] or an equivalent term was used, including *Generation Y* [26,35,36,55,59], *Millennials* [29-31,40,43-45,51,56,59], *Net Generation* [42,43,45,55,59], *Net Set* [42], *Google Generation* [59] *Generation Z* [26,29,33,34,40,41,51]; however, Mather et al. [37] avoided the use of these terms, referring to *the next generation*.

3.3.2. Digital Native assumptions

Digital Natives were defined by Prensky [61] as anyone born after 1980; however, time specifications for generations differ between researchers [59], with *Generation Y* or *Millennials*, born between 1981 and 1995 [64], *The Net Generation or Net Set* born between 1980 and 2001 [42], *the Google Generation* born after 1993 [65] and *Generation Z* born between 1996 and 2010. Assumptions about the specific attributes of different generations and their engagement with digital technologies were evident in a number of sources of evidence. *Generation Y* was described as "a unique and truly Digital Native generation" [51] (p.180), with the "ability to obtain instantaneous results" [26] (n.p.) due to access to digital devices and the expectation of immediacy in responses and information [44]. *The Net Generation* were described as "transforming the historical image of the college experience and classroom" [42] (p.359), having unique learning styles [55] and information literate [43]. *Generation Z was* identified as being uniquely diverse, tech-savvy and self-motivated [40], hyperconnected to digital technologies [34] and true Digital Natives [51]. Overall, *Digital Natives* were noted to require flexible, collaborative and individualised learning [46], were confident in the use of digital technologies [60] and sought electronic resources for accessing health-related information [53].

3.3.3. Digital Native criticisms

The debate about the Digital Native has been described as an academic form of a moral panic, with suggestions that the education system must be fundamentally changed to meet the need of a new generation of students [66]. Brown and Czerniewicz [67] noted that one of the major issues with the terminology was the creation of a false dichotomy or binary opposition between those who were considered natives and those who were not. Similarly, some of the sources of evidence highlighted the problematic nature of the Digital Native narrative. Walker et al. [35] found no statistical differences between the learning and teaching needs of Generation X and Generation Y students. And Hills [36] (p.15), in a systematic review of *Generation Y Health Professional Students' Preferred Teaching and Learning Approaches*, concluded that the review could "neither confirm nor refute taking a generational perspective to explore teaching and learning preferences" and noting that "Preferences among generational groups were not consistent".

4. Discussion

4.1 The history of the Digital Native

Generational Theory was developed as a mechanism in sociology to explain differences between population cohorts [68] and was most notably described by Mannheim [69], a German sociologist in the 1950s, who asserted that the study of generations provided a means of understanding society, and that generations were primarily formed through a common location in history with shared experiences and events. Subsequent Generational Theories highlighted the importance of understanding generational differences to facilitate social change [69] and as a tool to decode reality [70], with Ryder [69] (p.40) describing "the succession of birth cohorts (a construct similar to

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Mannheim's formulation of generations) as a process of lending flexibility and providing new perspectives to address social problems". In 1998, Tapscott [63] (p.2) published *Growing up digital: The rise of the net generation* stating "…it is through the use of digital media that the N-Generation will develop and superimpose its culture on the rest of society…they are a force for social transformation". Several years later, Prensky [12] published *Digital Natives, Digital Immigrants* and exclaimed that there was a radical change seen in the students of today, declaring that they were no longer compatible with the education system designed to teach them. From the literature conceptualising a generation who inherently knew how to use digital technologies to such an extent, it was suggested this could result in physical changes in the brain [12,61]. This became embraced in public discourse [15], resonated with teachers, parents and policy-makers [62] and, despite debate in academic circles, became part of the cultural lexicon [71-73].

4.1.1 The Digital Native debate

Since the term *Digital Native* was first described in 2001 [12], the metaphor has been debated. Prensky [12] (n.p.) described this population as "all 'native speakers' of the digital language of computer, video and the Internet" with multi-tasking, parallel thinking abilities and a lack of patience for traditional learning approaches [12,61,74]. The concept of the Digital Native has been cited in many studies since this time [3,47,66,67,73] and continues to be mentioned in contemporary literature [46,75-78]. Criticisms of the Digital Native metaphor have pointed to a lack of empirical evidence in Prensky's work [11,66,67,72,79], the assertion that exposure to digital technologies correlates with digital competence [11,15,79], overly emotive language [62,66,79], a false dichotomy between generations [15,66,72,80] and recommendations to abandon traditional teaching methods [11,66,78,80]. In 2009, Prensky [81] moved away from the Digital Native terminology to *Digital Wisdom*, indicating that as the generations increasingly move into the 21st century, everyone will have grown up with digital tools and technologies, so that the distinction between Digital Natives and digital immigrants will blur; he also acknowledged that digital literacy and the ability to critique and evaluate digital technologies was an essential skill [15]. One issue, often overlooked in the Digital Native debate, has been the *Digital Divide*, described as the gap between those people with access to easy-to-use digital technologies and the internet and those without this access [82]. Populations without access to these technologies include rural residents [82,83], low-income households [82,84], people with lower levels of education [82,85], and those from developing nations [84,86,87], with this lack of access identified as a human rights and social justice issue [82]. Despite these factors, the Digital Native rhetoric has persisted, with the continued promotion of this vocabulary having many beneficiaries including those with commercial interests [71], and providing an unrealistic and ill-informed foundation for developing appropriate policy-making and practice [88]

4.1.2 Higher Education responses to the Digital Native debate

The responses by tertiary institutions to the Digital Native debate have been mixed. Smith [79] (n.p.), in noting the popularity of the Digital Native discourse, observed that despite "a growing body of recent evidence challenging such notions of students as digital natives", there remained a dominant perception within higher education of the Digital Native generation. Burton [89] noted, that the myth of the Digital Native and the belief in the internet as a 'panacea' for rising education costs and demands for authentic learning experiences, resulted in the widely held assumption that online learning was a quick, inexpensive and effective way of teaching. However, fundamental changes were required at an institutional level for effective online education to be realised. Other research noted that when educators assumed students to be Digital Natives, a note of caution was required, for digital competence must be developed, not assumed [90]. A more nuanced approach, that better informed and reflected the higher education and technology issues facing the current generations was recommended [79,91], with Bennett [91] (p.329) stating that it was "time to move beyond the 'digital natives' debate as it currently stands, and towards a more sophisticated, rational debate that can enable us to provide the education that young people deserve". This required the consideration of digital literacy skills among this cohort, and learners more generally.

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4.2 Digital literacy

4.2.1 Defining digital literacy

As innovations in digital technologies have evolved, the language used to describe the knowledge, skills and attitudes required to use these technologies has also changed [13]. Boechler et al. [13] in *Digital Literacy Concepts and Definitions: Implications for Educational Assessment and Practice*, observed the evolution of these literacies from computer literacy, information literacy, and network literacy to digital literacy (knowledge and skills), with further development to include a range of sub-categories including e-literacy, digital competence and multimodal literacies. Alexander et al. [5] noted that definitions of digital literacy were nebulous, requiring greater clarification and identified three different digital literacies: *universal literacy* – a baseline literacy embracing a critical stance towards all digital technologies, *creative literacy* – emphasising the technical skills of digital content production, and *literacy across disciplines* – a diffusion of digital literacy across the education curriculum which reflects the different learning contexts. Digital literacy remains a contested concept and its use has been inconsistent in the literature [92,93]. Digital literacy definitions have included "…socially situated practices supported by skills, strategies, and stances that enable the representation and understanding of ideas using a range of modalities enabled by digital tools" [94] (pp. 66-67), "the ability to use digital technologies—both hardware and software—safely and appropriately" [95] (p.3) and "those capabilities which fit an individual for living, learning and working in a digital society" [2] (n.p.). This presents challenges in being able to agree on a common lexicon.

4.2.2 Institutional responses to Digital Literacy

WHO – World Health Organization

Globally, institutional responses to digital literacy have been diverse. In *Global diffusion of eHealth: Making universal health coverage achievable*, the World Health Organization (WHO) [96] identified barriers to the global use of eHealth, and acknowledged the need for a digital literate health workforce, with the use of digital technologies in education recognised as a foundational element for healthcare worker training. Key factors associated with sustaining digital learning and educational transformation include recognising the current challenges of insufficient health worker competence, a lack of access to information and poor adherence to guidelines. The resultant recommendations included the "digital provision of training and educational content for health workers under the condition that it complements rather than replaces traditional methods of delivering continued health education and in-service training" [97] (p.75).

Jisc – formerly the Joint Information Systems Committee

Established in 1993, Jisc is a not-for-profit digital, data and technology agency providing support for higher education institutions within the United Kingdom [98]. The agency provides useful advice by creating several guides to support the strategic development of digital literacies in higher education, and identifying the seven elements of digital literacies that have applicability across all higher education teaching, including undergraduate nursing. The seven elements should be purposefully considered by all educators, as follows:

1. *Information Literacy* – the capability to find, critique and manage information
2. *ICT Literacy* – the capability to adopt, adapt and use digital technologies
3. *Learning Skills* – the capability to learn and study in a digital technology environment
4. *Digital Scholarship* – the capability to participate in academic, research and professional environments that use digital technologies
5. *Media Literacy* – the capability to critique and create academic and professional information using digital technologies
6. *Communications and collaboration* – the capability to participate in digital environments for education and research, and

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7. *Career and identity management* – the capability to develop and manage a professional digital identity [98].

NMC – New Media Consortium

Since 2004, the New Media Consortium (NMC) has been responsible for publishing the Horizon Reports [99], which results from expert panel discussions and evaluations of contemporary trends in educational technologies. These reports are seen as valuable by the higher education sector, cited in academic literature and have the potential to influence pedagogical approaches [100]. The Horizon Report was first published in 2004, a short time after the release of Prensky's seminal work [12] *Digital Natives, Digital Immigrants*. A recent Horizon Report on higher education identified the 'solvable challenge' of improving digital literacy, noting the current deficits in the promotion of digital literacy in higher education and advocating for the changing roles of educators to have more personal connections with students [101]. However, in *A critical assessment of the NMC Horizon reports project* [100], it was noted that New Media Consortium (NMC) responsible for publishing the Horizon Reports, had utilised a panel of experts including digital technology companies such as Apple Computer, Sony, Macromedia and Adobe Systems. The contention then was that the information promulgated by the membership could have a leaning towards positive technological instrumentalism, and the implicit assumption that technology is always better.

4.2.3. Higher Education responses to Digital Literacy

Whilst it has long been acknowledged that students require digital literacy skills to effectively engage with digital technologies [8,9,95,102], many higher education institutions have not adequately recognised digital literacy as one of the foundational literacies [9]. Murray and Perez [9] (p.95) in their discussion of the digital literacy paradox in education, warned that exposure to digital technologies was not sufficient to develop digital literacy and that "comprehensive digital literacy strategies that reach back to the youngest students and ensure that college graduates enter the workforce armed with these critical competencies" were an urgent need. The need for comprehensive and explicit digital literacy education to develop the necessary skills for the construction of learning is prefaced on the understanding that access to information cannot be seen as equivalent to access to knowledge [8]. The development of digital literacy, within higher education, requires "an institution-wide approach to building information, digital and data literacy skills", thereby strengthening high-quality learning experiences [6] (n.p.). It is therefore important to acknowledge the digital competence required for teaching and learning in undergraduate nursing.

4.3 Implications of the Digital Native narrative on the digital literacy of undergraduate nursing students

As the largest healthcare workforce [103], nurses need to embrace digital technologies to effectively function within the contemporary healthcare environment [104-106]. Theron et al. [107] (p.154) observed that "nurses use information and knowledge to inform practice and to educate individuals, families and communities with information that will assist them in making healthcare decisions that will positively impact their quality of life". Therefore, knowledge and understanding of digital information are necessary for undergraduate nursing curricula to prepare graduates for an increasingly digital workplace [108-111]. As Brown et al. [106] (p.457) observed "It is imperative that curricula are developed and implemented so that students' preexisting and everyday digital literacy can be further developed, enhanced, and transposed to the bedside". The failure to recognise digital literacy as a foundational competency, and the focus on the Digital Native are impeding the essential development of these necessary workforce skills.

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4.4 Recommendations

Digital literacy is an essential requirement for undergraduate nursing students as they prepare to enter the workforce. However, this review has demonstrated that the continued dissemination of the myth of the Digital Native, which is accompanied by the perception that students arrive at university with digital literacy capabilities, is impacting students' abilities to search efficiently, critique information and recognise the inherent risk of bias in information sources. From this study, the following recommendations are proposed:

1. A global set of core Nurse Educator Digital Literacy competencies are identified, that can be contextualised to individual jurisdictions.
2. National Nursing Accreditation agencies adopt and contextualise National Nurse Educator Digital Literacy competencies, and require all nurse academics to demonstrate their digital literacy competency accordingly.
3. Nurse Educator Digital Literacy competencies are recognised and aligned with existing, national digital health competency frameworks.
4. National Nursing Digital Literacy competencies for entry into practice as a Registered Nurse be developed and adopted, cognisant of the existing global efforts and frameworks, to inform undergraduate nursing curricula.
5. National Nursing Accreditation and registration agencies update undergraduate course accreditation guidelines that reflect the development and assessment of the National Nursing Digital Literacy competencies.

5. Conclusions

This review has shown the dilemma facing today's students and educators when relying on assumptions of digital capabilities, which can unwittingly perpetuate the myth of the Digital Native. The implications of this are profound for undergraduate nursing education.

The literature presented in this review supports the contention that digital literacy is an essential requirement for undergraduate nursing students and nurses, and is associated with safe, evidence-based practice. The myth of the Digital Native presents a challenge to educators and curricula alike, as exposure to digital technologies does not necessarily equate with digital literacy. This assumption must be continually tested to ensure that nursing education programs are reflective of required practice in a digital world.

The five recommendations established from this research should inform future discussions and studies that investigate, substantiate, and further encourage discourse throughout the nursing education and digital health community. Digital literacy skills must be a part of undergraduate nursing curricula.

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Appendix A [18]

Scale for the Assessment of Narrative Review Articles – SANRA

Please rate the quality of the narrative review article in question, using categories 0–2 on the following scale. For each aspect of quality, please choose the option which best fits your evaluation, using categories 0 and 2 freely to imply general low and high quality. These are not intended to imply the worst or best imaginable quality.

1) Justification of the article's importance for the readership

- The importance is not justified. — 0
- The importance is alluded to, but not explicitly justified. — 1
- The importance is explicitly justified. — 2

2) Statement of concrete aims or formulation of questions

- No aims or questions are formulated. — 0
- Aims are formulated generally but not concretely or in terms of clear questions. — 1
- One or more concrete aims or questions are formulated. — 2

3) Description of the literature search

- The search strategy is not presented. — 0
- The literature search is described briefly. — 1
- The literature search is described in detail, including search terms and inclusion criteria. — 2

4) Referencing

- Key statements are not supported by references. — 0
- The referencing of key statements is inconsistent. — 1
- Key statements are supported by references. — 2

5) Scientific reasoning

(e.g., incorporation of appropriate evidence, such as RCTs in clinical medicine)

- The article's point is not based on appropriate arguments. — 0
- Appropriate evidence is introduced selectively. — 1
- Appropriate evidence is generally present. — 2

6) Appropriate presentation of data

(e.g., absolute vs relative risk; effect sizes without confidence intervals)

- Data are presented inadequately. — 0
- Data are often not presented in the most appropriate way. — 1
- Relevant outcome data are generally presented appropriately. — 2

Sumscore

Fig. 1 SANRA - Scale

Figure A1. Sandra—Scale.

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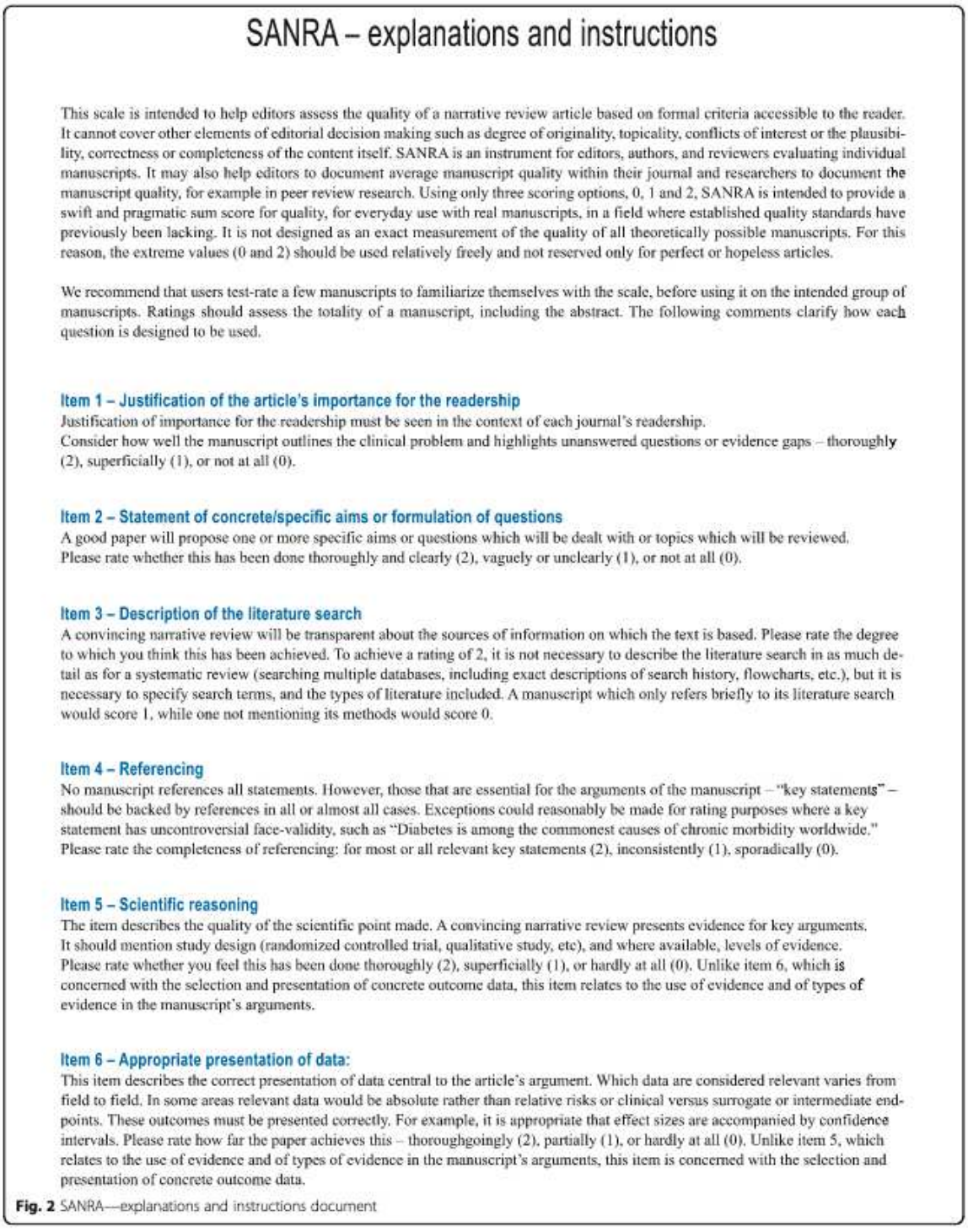

SANRA – explanations and instructions

This scale is intended to help editors assess the quality of a narrative review article based on formal criteria accessible to the reader. It cannot cover other elements of editorial decision making such as degree of originality, topicality, conflicts of interest or the plausibility, correctness or completeness of the content itself. SANRA is an instrument for editors, authors, and reviewers evaluating individual manuscripts. It may also help editors to document average manuscript quality within their journal and researchers to document the manuscript quality, for example in peer review research. Using only three scoring options, 0, 1 and 2, SANRA is intended to provide a swift and pragmatic sum score for quality, for everyday use with real manuscripts, in a field where established quality standards have previously been lacking. It is not designed as an exact measurement of the quality of all theoretically possible manuscripts. For this reason, the extreme values (0 and 2) should be used relatively freely and not reserved only for perfect or hopeless articles.

We recommend that users test-rate a few manuscripts to familiarize themselves with the scale, before using it on the intended group of manuscripts. Ratings should assess the totality of a manuscript, including the abstract. The following comments clarify how each question is designed to be used.

Item 1 – Justification of the article's importance for the readership
Justification of importance for the readership must be seen in the context of each journal's readership.
Consider how well the manuscript outlines the clinical problem and highlights unanswered questions or evidence gaps – thoroughly (2), superficially (1), or not at all (0).

Item 2 – Statement of concrete/specific aims or formulation of questions
A good paper will propose one or more specific aims or questions which will be dealt with or topics which will be reviewed.
Please rate whether this has been done thoroughly and clearly (2), vaguely or unclearly (1), or not at all (0).

Item 3 – Description of the literature search
A convincing narrative review will be transparent about the sources of information on which the text is based. Please rate the degree to which you think this has been achieved. To achieve a rating of 2, it is not necessary to describe the literature search in as much detail as for a systematic review (searching multiple databases, including exact descriptions of search history, flowcharts, etc.), but it is necessary to specify search terms, and the types of literature included. A manuscript which only refers briefly to its literature search would score 1, while one not mentioning its methods would score 0.

Item 4 – Referencing
No manuscript references all statements. However, those that are essential for the arguments of the manuscript – "key statements" – should be backed by references in all or almost all cases. Exceptions could reasonably be made for rating purposes where a key statement has uncontroversial face-validity, such as "Diabetes is among the commonest causes of chronic morbidity worldwide."
Please rate the completeness of referencing: for most or all relevant key statements (2), inconsistently (1), sporadically (0).

Item 5 – Scientific reasoning
The item describes the quality of the scientific point made. A convincing narrative review presents evidence for key arguments. It should mention study design (randomized controlled trial, qualitative study, etc), and where available, levels of evidence.
Please rate whether you feel this has been done thoroughly (2), superficially (1), or hardly at all (0). Unlike item 6, which is concerned with the selection and presentation of concrete outcome data, this item relates to the use of evidence and of types of evidence in the manuscript's arguments.

Item 6 – Appropriate presentation of data:
This item describes the correct presentation of data central to the article's argument. Which data are considered relevant varies from field to field. In some areas relevant data would be absolute rather than relative risks or clinical versus surrogate or intermediate endpoints. These outcomes must be presented correctly. For example, it is appropriate that effect sizes are accompanied by confidence intervals. Please rate how far the paper achieves this – thoroughgoingly (2), partially (1), or hardly at all (0). Unlike item 5, which relates to the use of evidence and of types of evidence in the manuscript's arguments, this item is concerned with the selection and presentation of concrete outcome data.

Fig. 2 SANRA—explanations and instructions document

Figure A2. Sandra—Explanations and instructions document.

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