21st Century Skills: meaning, usage and value

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Abstract

The idea of 21st century skills has been popular in higher education, and education in general, for the last couple of decades. At the heart of this idea is the belief that those leaving education for the workplace now require a particular skill set in order to succeed and help deliver an improving economy and society in an increasingly competitive and complex world. This article identifies and discusses the reasons for the popularity of the term. It examines successively the origins and meaning of 21st century skills, their development and usage over time, and the issues and critiques that have been raised concerning them. It then comes to some conclusions about the usefulness and validity of the term.

Introduction

The idea of 21st century skills has been popular in higher education, and education in general, for the last two or three decades. At the heart of this idea is the belief that those leaving education – at different levels – for the workplace now require a particular skill set in order to succeed and help deliver an improving economy and society in an increasingly competitive and complex world. Adding the words '21st century' to this skill set suggests that the skills required are significantly different to, indeed an enhancement of, those that were needed previously: i.e. in the 20th century and earlier.

The use of the words '21st century' may, of course, be dismissed as mere labelling, as it is surely coincidental that the perceived need for graduates and school-leavers to possess a particular, and changed, skill set has occurred, if it has, as a new millennium has begun; literally, one might say, at the stroke of midnight on December 31st 1999 or 2000 (take your choice). Many other labels – e.g. core, cross-curricular, employability, generic, graduate, holistic, key or transferable skills (and/or attributes or competences) – have been used in the recent past to convey much the same idea at different times and for different purposes. Yet, 21st century skills has clearly caught the imagination, for the time being at least, and impacted upon policy, practice and research.

The aim of this article is to identify and discuss the reasons for this development. The article will examine successively the origins and meaning of the term, its development and usage over time, and the issues and critiques that have been raised. In doing so, it will seek to come to some conclusions about the usefulness and validity of the term.

Methodologically, the article makes use of the techniques of systematic review (Jesson, Matheson and Lacey 2011, Torgerson 2003). Databases – Google Scholar, Scopus and Web of Science – were searched using keywords to identify potentially relevant articles and reports that had been published on the topic. Those identified were then downloaded and examined, and retained for further analysis if they proved to be relevant. The reference lists in these articles and reports were checked for other potentially relevant sources to follow up.

Origins and Meaning

Perhaps one of the most interesting things about the use of the term '21st century skills' is its very recency; though, on further reflection, this should perhaps not be surprising. Judging by bibliographic searches, it came into common usage shortly before the century/millennium changed. In the late 20th century there was increasing discussion about the skills – then typically termed core, generic, key or transferable skills - that would be needed for,

or in, the 21st century, and this then morphed effortlessly into discussion of '21st century skills'. This term was then taken up and used widely – alongside other terms - by policy-makers, practitioners and researchers in the fields of higher education and education in general.

The meaning of the term is, of course, a key question. Like many other terms in widespread use, '21st century skills' has been explained in varied ways and there is no generally accepted definition. In part, these differences are due to whether 21st century skills are seen as being equivalent to digital skills – i.e. the skill set, related to the awareness and use of information and communication technologies, that has developed most and fastest in recent years - or as something rather broader, and developing from earlier ideas of core, generic, key or transferable skills.

On this point, van Laar and her colleagues (2017), a group of Dutch researchers, undertook a systematic literature review, identifying 75 relevant published articles:

> 21st-century skills are broader than digital skills – the list of mentioned skills is far more extensive… 21st-century skills are not necessarily underpinned by ICT [information and communication technology]… we identified seven core skills: technical, information management, communication, collaboration, creativity, critical thinking and problem-solving. Five contextual skills were also identified: ethical awareness, cultural awareness, flexibility, self-direction and lifelong learning. (p. 577; see also van Laar et al 2020)

Van Laar et al, therefore – like the majority of authors – regard 21st century skills as more encompassing than just digital skills. Their list is impressive, and few would deny the usefulness of the 'skills' identified, though many would also suggest alternative skills or labels for them. One might, though, question whether some of these attributes – such as creativity and lifelong learning – were really skills, as well as whether a quality like awareness can be classified as a skill.

Two American authors, Trilling and Fadel (2009), focusing on school education, came up with a different but overlapping listing of skills related to learning and innovation, digital literacy, and career and life. Their '7Cs' 'skills of 21st century learning' were, however, somewhat hampered by the compulsion to start each skill with the letter 'c':

- critical thinking and problem solving
- creativity and innovation
- collaboration, teamwork and leadership
- cross-cultural understanding
- communications, information and media literacy
- computing and ICT literacy

- career and learning self-reliance (p. 176)

There is, indeed, a considerable overlap between these two categorisations, suggesting that there is a good deal of shared understanding of what 21st century skills are internationally. The main difference would seem to be that Trilling and Fadel give no obvious equivalent for two of van Laar et al's 'contextual' skills - ethical awareness and flexibility – though perhaps these are skills that develop a little later in life.

Unsurprisingly, many other definitions and lists are available, but interrogating just two of these usefully illustrates some key points. Thus, on the one hand, the idea of 21st century skills can be fairly all-encompassing; while, on the other hand, which specific skills are included or prioritised is a matter for some debate.

Development and Usage

The term 21st century skills caught on rapidly and internationally; it was used in government documents on both sides of the Atlantic in the late 20th century (US Department of Commerce et al 1999) and early 21st century respectively (UK Department for Education and Skills 2003). It also quickly became part of the terminology used by international organisations such as the Organization for Economic Cooperation and Development (OECD) (Ananiadou and Claro 2009).

In national terms, examples of the usage of the term 21st century skills (in English language publications) may be found not just in the obvious examples of the United States (Kim, Raza and Seidman 2019) the United Kingdom and Australia, but in such diverse countries or systems as Finland (Vuojarvi, Eriksson and Vartiainen 2019), Lebanon (Ghaith 2010), Luxembourg (Greiff et al 2014), Norway (Hilt, Riese and Soreide 2019), Thailand (Chaiyama 2019), Turkey (Burakgazi et al 2019) and the United Arab Emirates (Ghafar 2019). Regionally, studies have focused on, for example, South-East Asia (Khlaisang and Songkram 2019).

Ananiadou and Claro (2009) report survey responses on the topic from 17 OECD countries or regions, noting the widespread acceptance of 21st century skills in education systems but a lack of guidance on what they were, and how they were to be taught and assessed:

> most countries or regions cover 21st century skills and competencies in their regulations, guidelines or recommendations for compulsory education. However, there are few specific definitions of these skills and competencies at national or regional level and virtually no clear formative or summative assessment policies for these skills. The only evaluation regarding their teaching is often left to external inspectors

> as part of their whole school audits. Similarly there are few teacher training programmes that target the teaching or development of 21st century skills, although there exist several teacher training initiatives that focus on developing teachers' ICT pedagogical skills, most of them optional. (p. 4)

Taking a different approach, Silber-Varod, Eshet-Alkalai and Geri (2019) employed content analysis to trace changes in the research on core digital literacy competencies – in this case being used as a synonym for 21st century skills - in the educational academic literature from 1980 to 2016:

> Based on well-established frameworks of digital literacy competencies, this research examined seven skills: Collaboration, Communication, Creativity, Critical thinking, Information literacy, Problem-solving and Socio-emotional skills. Data were collected through advanced search queries of peer-reviewed publications in the Education Resources Information Center (ERIC) database. Findings reveal that among the examined terms, Communication is the most prominent digital literacy skill, followed by Problem Solving and Collaboration. Furthermore, within the context of Skills, the most prominent terms are Information Literacy and Critical thinking; Technology and Collaboration are least mentioned. Our findings suggest that awareness of digital learning competencies in educational research literature is marginal, implying that educational research seems to lag behind the need to understand the ever-changing digital competencies that instructors and learners need. (p. 3099)

One might, of course, question the use of terms such as 'ever-changing', which imply an urgency and immediacy which might not be justified. Nevertheless, on this evidence, both educational researchers and policy-makers appear to be lagging behind in their response to the developing ideas underlying 21st century skills.

Issues and Critiques

The notion of 21st century skills (and cognate terms) has been the subject of considerable discussion, debate and critique. A series or related issues will be discussed here, including the novelty of the idea, what it actually encompasses, the pedagogical issues involved, how these skills might be measured, the question of skill transfer, what might be termed the liberal education backlash, and, most fundamentally, whether specific attention to skills development is actually needed.

Novelty

The first question to be asked about 21st century skills is, then, is there anything new here? As has been indicated, cognate ideas such as core skills (e.g. Bennett, Dunne and Carre 1999, Dunne 1999, Dunne, Bennett and Carre 1997), employability skills (Fallows and Steven 2000b, Kornelakis and Petrakaki 2020, Mason, Williams and Cranmer 2009, Pouratashi 2019, Suleman 2018), generic skills (e.g. Billing 2003, Jaaskela, Nykanen and Tynjala 2018, Kearns 2000, Leckey and McGuigan 1997, Okolie et al 2020, Williams 2019), graduate attributes (Oliver and Jorre de St Jorre 2018, Osmani et al 2015), key skills (e.g. Fallows and Steven 2000a, Washer 2007) and transferable skills (e.g. Bridges 1993, Carter et al 2019, Kemp and Seagraves 1995, Marginson 1994), as well as other variants, have been widely promoted and discussed for the last few decades, and continue to be so.

For example:

> A Google search of the term 'transferable skills' turned up 10 references between 1950 and 1960… In the 1960s and 1970s, there were over 400 references to transferable skills, more than 6000 between 1980 and 2000, and 27,300 citations after 2000. By the 1990s, the term '21st-century skills' frequently began to appear in the literature. (Breslow 2015, p. 421)

If, as Breslow suggests, 21st century skills are just a replacement, or perhaps competitor, for transferable skills and related ideas, what does it add that is new or useful? Why do we need another, and potentially further confusing, term when the research literature on core, generic, key and transferable skills is already well established? Does the mere passage of (not a great deal of) time, and the happenstance of a new century and/or millennium – as calculated within an essentially arbitrary reckoning of the date – really justify this? If so, we might also ask, as we are already two decades into the new century, how long 21st century skills will have their cachet? Must we talk soon instead of mid-21st century skills or some other term?

This argument is made plainer if we examine the contents of these various skills packages in some more detail.

Content

We have already quoted three sources - Silber-Varod, Eshet-Alkalai and Geri (2019), Trilling and Fadel (2009) and van Laar et al (2017) – on the contents of 21st century skills. They each produced extensive, and considerably overlapping, lists. Thus, between them, they identified: career self-reliance, collaboration, communication, creativity, critical thinking,

cultural awareness (or cross-cultural understanding), ethical awareness, flexibility, information and media literacy (or computing and ICT literacy, or information management, or technical skills), innovation, leadership, lifelong learning (or learning self-reliance), problem-solving, self-direction, socio-emotional skills and teamwork.

Even though I have interpreted some of the skills identified in these three sources as meaning or referring to essentially the same thing, this is still a long and impressive list of attributes for anyone to have or aspire to. While it could be expanded, or made more detailed, by reference to additional sources and authors, this listing is more than adequate to illustrate the range and diversity of skills being referred to.

What, then, did the proponents of core, generic, key or transferable skills identify? Were their listings much different from those of the 21st century skills that we have identified? Towards the end of the last century, Dunne, Bennett and Carre (1997) offered a telling comment on core and transferable skills:

> Identical lists may in one context be labelled 'core' skills and in another 'transferable' skills. Many include 'communication', 'numeracy', 'information technology', 'personal' or 'interpersonal' skills, and 'problem-solving' — reflecting the requirement, especially in vocational contexts, for a grounding in basic (or even remedial level) knowledge and communicative skills. (p. 514)

All of these skills were identified in the lists of 21st century skills we have examined – including the information technology or digital skills which some have argued are so critical to the 21st century - along with other related, or more disaggregated, skills.

In terms of generic skills, Billing (2003) carried out a useful and extensive comparative analysis of the skills identified as important by educators, employers and policy-makers in different parts of the world. He noted that:

> Despite precise definitions of these skills being dependent on the workplace context, employers in English cultures behave in their recruitment and training activities as if there is a common understanding of generic skills needs. Overall, communication emerges as the most important skill valued by stakeholders in most countries surveyed. Beyond this, there is a substantial consensus on the important generic skills amongst UK stakeholders: communication skills; team-work; self-management; and problem-solving. For the other countries, there is some evidence of similarities to the UK for Australia, New Zealand and South Africa. While there seems less commonality in the various US lists than for the UK, there

> is some consensus on: communication; conceptual skills; and social interaction skills. (p. 346)

Information technology or digital skills are not specifically mentioned here, though application of technology, information management and numeracy do appear in Billing's longer listing. Billing also makes the useful points that stakeholders do not agree on which are the most critical skills or on what they mean in practice.

Washer (2007) focused on key skills in higher education, examining the arguments for and against. His listing (p. 62) of these skills included: communication skills, working with others, problem solving, numeracy, the use of information technology, learning how to learn, personal and professional development. Again, there would appear to be relatively little difference between this and the listings of 21st century skills previously quoted.

More recently, Oliver and Jorre de St Jorre (2018) assessed the graduate attributes most commonly identified in Australia by universities and disciplinary organisations. These included communication, critical thinking, global citizenship, teamwork, independence, problem-solving and information literacy; as well as, less commonly, self-reliance and confidence, leadership, scholarly integrity, numeracy and interdisciplinarity.

Rios et al (2020) performed an extensive analysis, this time using the terminology of 21st century skills, in examining what contemporary job advertisements on American websites indicated about the skills most desired by employers. They argued that:

> Our descriptive analysis of 142,000 job advertisements provides two contributions. First, this is one of the first studies to empirically rank-order skill demand. In doing so, it is clear that oral and written communication, collaboration, and problem-solving skills are in high demand by employers, with particular emphasis on the pairing of oral and written communication. Furthermore, it is apparent that many of the skills suggested in the literature as being critical for workplace success are in very low demand by employers, and some were not found to be mentioned at all (e.g., social responsibility). Second, this study explicitly examined whether 21st-century skill demand varied by job characteristics, which was found to be the case, with differences being noted for both education level and degree field requirements. (p. 80)

Interestingly, their listing of 21st century skills did not specifically identify digital or information technology skills.

The obvious conclusion from these comparisons of the skills identified as being of importance is that there is no real difference between core, generic, key, transferable and 21st century skills. They are simply alternative labels: the contents, while flexible, are profoundly similar.

The issue of why we use so many alternative labels for what is essentially the same thing is, though, of some interest. Partly, this is simply a human characteristic, perhaps somewhat magnified amongst academic humans; but, in part, it also appears to be fashion. Keeping up interest, or stirring new interest, in a topic is helped by the use of contemporary and changing labels.

Pedagogical Considerations

From the perspective of higher education institutions, probably the most problematic aspect of 21st century skills is not what they are but how do you teach them? Universities and colleges, and the academic staff they employ, are used to teaching their own self-devised curricula, carefully put together to cover the fundamentals of the discipline or sub-discipline concerned, and the expectations of relevant professional bodies, as well as to showcase the knowledge of the academics concerned.

Adding the requirement that, in addition to teaching the content and skills (such as laboratory or field work) of the discipline, higher education courses have to develop 21st century skills as well causes difficulties. In many cases, therefore, as with the multitude of recent demands for higher education to develop other qualities – from enterprise to internationalism to sustainability (which are, of course, nowadays sometimes incorporated within 21st century skills) – the response has been to do so within a generic, centrally run and standalone unit (or units), which students take alongside and as well as their standard courses.

This has led, inevitably, to the alternative perspective that 21st century skills have a disciplinary component, and that their teaching should be discipline-focused and embedded within existing degree courses in so far as possible. While most academics may be convinced that their courses are excellent vehicles for the development of critical thinking, communication skills and the rest, however, this needs to be demonstrated (and is discussed further later in this article). Significant curricular changes to improve the development of, for example, collaborative skills through group work may also need to be introduced.

Whether a discipline-based or centralised approach is adopted, however, much remains to be done if the apparent promise of the 21st century skills movement is to be realised. Chan et al (2017), in a review of the literature, note 'the lack of institutional and curriculum support, the lack of clarity

about the conceptualisation/definition of generic competencies, a classic debate that has persisted over the years', and that 'teaching pedagogy, curriculum and students' experience and learning strategy are currently not aligned to ensure the adoption of a systematic approach to developing generic competencies' (pp. 6-7)

Measurement

Another key issue with 21st century skills – as with all skills – is how they are measured or assessed. There are two basic approaches: either we rely on a self-report by the student/graduate concerned, or their employer, or we attempt to measure the skills directly. The latter approach is sometimes referred to as 'objective' measurement, though it is hardly that, as two or more assessors or methods of assessment might well come up with somewhat different results.

Self-report is probably the most popular approach internationally, as it is less demanding. Thus, in Australia the Student Experience Survey asks students each year about their development of a range of skills, while the Employer Satisfaction Survey asks employers for their opinions on graduate attributes (Oliver and Jorre de St Jorre 2018). Similar annual surveys are conducted in the United Kingdom, the United States and other countries. The chief problem, of course, is just how reliable these estimates are, with students likely, on average, to over-estimate their abilities, while employers tend to be more critical and demanding.

The alternative approach, of attempting to directly measure 21st century skills, is also problematic. For, while it may be relatively straightforward to measure fairly simple skills - such as the ability to attend a meeting on time or fill out a form correctly – by observation, this is not the case with the multitude of abilities included under the label of 21st century skills. The ability to communicate, collaborate or problem solve are rather more complex and multi-faceted skills, and their level of attainment may be more questionable.

Surveys and multiple choice tests have been widely used to measure 21st century skills, but a range of other strategies have also been developed. Vista (2020, p. 1), for example, 'presents an approach to skills valuation that focuses on the extent to which a skill facilitates occupational transitions as its measure of value. This valuation metric is then developed using a graph-theoretic approach'. This leads to a ranking of which 21st century skills are the most highly valued amongst different occupational groups, rather than the measurement of which skills have been attained by given individuals.

Shavelson et al (2019) focus on the assessment of one particular 21st century skills, critical thinking, using the technique of criterion sampling measurement. This involves 'developing performance assessments using "criterion" tasks, which are drawn from real-world situations in which students are being educated, both within and across academic or professional domains' (p. 337). Their assessment by some third party could, however, be problematic.

Scoular and Care (2019) also focus on a particular skill, in their case collaborative problem solving (CPS), proposing a generalized scoring process for measuring its development in online environments: 'The method allowed the generation of items through the capturing, identifying, coding, searching, and recording of behaviors in log stream data. The generalized scoring process presents a streamlined method from which other CPS assessments can be designed, developed, and scored efficiently and sufficiently' (p. 233).

Clearly, the measurement of 21st century skills – whether overall or for particular elements – is not as straightforward or advanced as we might wish. At best, therefore, these attempts can only serve as a supplement to established methods of assessing student performance in higher education.

Skill Transfer

Clearly, there is little point in devoting time and effort to developing and measuring 21st century skills in students in higher education if those skills are not then subsequently used. The issue of whether skills can be readily transferred from one setting to another (whether within education or from education to work) has, therefore, attracted attention.

Billing (2007), based on a substantial literature review (what would now probably be termed a systematic review), considers the transfer of core or generic skills, concluding that:

> Transfer is fostered when general principles of reasoning are taught together with self-monitoring practices and potential applications in varied contexts. Training in reasoning and critical thinking is only effective for transfer, when abstract principles and rules are coupled with examples. Transfer is promoted when learning takes place in a social context, which fosters generation of principles and explanations. Transfer improves when learning is through co-operative methods, and where there is feedback on performance with training examples. The specificity of the context in which principles are learned reduces their transfer. Transfer is promoted if learners are shown how problems resemble each other, if they are expected to learn to do this themselves, if they are aware of how to apply skills

> in different contexts, if attention is directed to the underlying goal structure of comparable problems, if examples are varied and are accompanied by rules or principles (especially if discovered by the learners), and if learners' self-explanations are stimulated. Learning to use meta-cognitive strategies is especially important for transfer. (p. 483)

These guidelines confirm that the teaching of 21st century skills – or skills in general – within higher education is largely a waste of time unless students are involved in a discussion about what they are being taught, why they are being taught this, and what they might do with it. There also clearly needs to be connectivity across their whole higher education experience to encourage and enable the use of skills learnt in one course in other courses, as well as beyond into subsequent employment. What employers do to pick up on, further develop and utilise the skills developed in higher education may, therefore, be a future avenue for further research.

The Liberal Education Backlash

Then there is what we might term the liberal education backlash, the growing argument that the increased emphasis being placed on the development of 21st century skills is resulting in, at best, compromises being forced upon, or, at worst, the bastardization of the glories of, 'traditional' liberal higher education. If higher education becomes too utilitarian, too driven by the vocational demands of employers and governments, is it still a worthwhile higher education?

Thus, Williams (2005, p. 185), in an analysis of the terminology used in two UK government documents on further education, identifies what she refers to as two dominant discourses: 'skills are necessary for employability and increased prosperity and skills are necessary for social inclusion and a coherent society'. With such a focus, the opportunities for both higher-level academic study and the development of non-vocational skills are likely to be less.

Greenlaw (2015) also sees a tension between a concentration on the development of skills rather than of wisdom:

> while the twenty-first century skills movement possesses many pragmatically worthwhile features, its metanarrative of salvation through technology is not balanced in its view of what should count as worthwhile knowledge and pedagogy… To put it concisely, the grand story of the twenty-first century skills movement places too much emphasis upon the accumulation and manipulation of information, while it does not sufficiently value the attainment of wisdom. (p. 895)

In such an educational environment, the role of the lecturer or professor is likely to be down-graded: 'The metanarrative of twenty-first century skills undervalues the role of the teacher as an experienced expert who can frame students' learning by contextualizing and theorizing along with the students' (p. 897). It may be, after all, that the conventional approach to higher education is much more flexible and individualised than we sometimes credit it.

Are 21st Century Skills developed in Higher Education anyway?

There is a substantial literature on the impact of higher education on its students, much of it, given the earlier massification of higher education there, North American (e.g. Astin 1977, Bowen 1977, Feldman and Newcomb 1969, Pascarella and Terenzini 1991, 2005, Mayhew et al 2016). Thus, in the 1991 edition of their book, researched and written long before generic, transferable or 21st century skills were being widely talked about, Pascarella and Terenzini conclude:

> our synthesis of the evidence indicates that the college years are a time of student change on a broad front. A number of the shifts we observed appear to be fairly substantial in magnitude. Indeed, the changes that occur during college from freshman to senior year are generally the largest 'effects' we noted in our synthesis. It is the breadth of change and development, however, that is perhaps the most striking characteristic of the evidence. Students not only make statistically significant gains in factual knowledge and in a range of general cognitive and intellectual skills; they also change on a broad array of value, attitudinal, psycho-social, and moral dimensions. There is some modest tendency for changes in intellectual skills to be larger in magnitude than changes in other areas, but the evidence is quite consistent in indicating that the changes coincident with the college years extend substantially beyond cognitive growth. (p. 557)

This work has stimulated the completion of an increasing number of research syntheses (meta-analyses and systematic reviews), designed to summarise the research findings on the impact of higher education (Tight 2020).

Particular attention has been paid to the significant body of research on one specific 21st century skills, critical thinking, long regarded as a key, if not the key, element of a higher education worthy of the name. The findings of the meta-analyses of studies of the development of this skill have been generally positive, if somewhat mixed.

Abrami et al (2008) focused on instructional interventions that impacted upon critical thinking (CT) development. They:

> found 117 studies based on 20,698 participants, which yielded 161 effects with an average effect size of 0.341 and a standard deviation of 0.610. The distribution was highly heterogeneous… These findings make it clear that improvement in students' CT skills and dispositions cannot be a matter of implicit expectation. As important as the development of CT skills is considered to be, educators must take steps to make CT objectives explicit in courses and also to include them in both preservice and in-service training and faculty development. (p. 1102)

This does, of course, raise the question of whether and how critical thinking – along with other 21st century skills - can be explicitly taught. More recently, Abrami et al (2015) undertook another meta-analysis designed to address this question. They focused on strategies for teaching students to think critically, including '341 effects sizes drawn from quasi- or true-experimental studies that used standardized measures of CT as outcome variables' (p. 275). They concluded that:

> there are a number of promising teaching strategies for helping students develop CT skills and dispositions. Specifically, there are strong indications that dialogue, authentic instruction, and mentorship are effective techniques for the promotion of this goal. These techniques appear to be particularly effective when combined. (p. 305)

Tackling the same question, Niu, Behar-Horenstein and Garvan (2013) identified 31 relevant studies published in the period 1994-2009. They concluded that 'in general, critical thinking teaching interventions are effective and lead to an improvement in students' critical thinking skills… However, we must also recognize that the magnitude of the average effect of critical thinking teaching in college is small' (p. 126). They recommend, therefore, more research into which interventions are the most effective.

In a more recent meta-analysis, Huber and Kuncel (2016) come to the more positive conclusion that 'both critical thinking skills and dispositions improve substantially over a normal college experience' (p. 431): i.e. without making any special provision for developing them. This led them to 'argue against investing additional time and resources in teaching domain-general critical thinking' (p. 460), but without dismissing its possible usefulness within disciplinary teaching.

This finding should, though, reassure many of those working in higher education, suggesting that the experience of higher education should be

sufficient to develop critical thinking abilities – and probably many other 21st century skills as well - without any specific intervention.

Some Conclusions

How useful and valid, then, is the idea of 21st century skills? I have three main conclusions.

First, it seems clear that 21st century skills is merely the latest in a long line of similar terms, introduced from the late 20th century onwards, to draw attention to the perceived need to pay more and explicit attention to particular outcomes desired from higher education. The specific label adopted is an ephemeral fashion, and we shouldn't – given that we are now well into the 21st century – expect its currency to last much longer. It seems highly likely, however, that a new or alternative label will emerge, and be publicised, soon.

Second, while there is always scope for reflection and improvement, there are strong, research-based arguments to support the view that higher education, in general, is fairly successful in developing students' 21st century skills without any specific targeted interventions. Many might argue, of course, 'how could it be otherwise'? Higher education is a very demanding activity, that is meant to, and demonstrably does, have a major impact on its participants.

Third, and most importantly, the 21st century skills movement – and its various analogues – is probably best seen as another front in the ongoing, centuries old, debate about the purpose of higher education, and, in particular, its linkage to subsequent employment. While more and more of higher education is explicitly vocational in focus, the need to hold on to its broader liberal purposes as well has arguably never been more crucial.

Thus, the 21st century skills movement is both a flawed idea and one that needlessly undermines higher education. As a catch-all bag of varied and changing skills it is fundamentally flawed: how can anything that can be summarised and marketed as the '7Cs' (Trilling and Fadel 2009) have anything useful to contribute to the development of higher education? There is no conceptual weight here, and it is also an unnecessary movement. Higher education is an experience that has succeeded and developed for centuries largely on its own terms. 21st century skills, and its successor terms, should be placed firmly in the wastebin of false innovations.

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