EDUCATING CYBER-WISDOM

A FEASIBILITY STUDY

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The Jubilee Centre for Character and Virtues is a unique and leading centre for the examination of how character and virtues impact upon individuals and society. The Centre was founded in 2012 by Professor James Arthur. Based at the University of Birmingham, it has a dedicated team of over 20 academics from a range of disciplines, including: philosophy, psychology, education, theology and sociology.

With its focus on excellence, the Centre has a robust, rigorous research and evidence-based approach that is objective and non-political. It offers world-class research on the importance of developing good character and virtues and the benefits they bring to individuals and society. In undertaking its own innovative research, the Centre also seeks to partner with leading academics from other universities around the world and to develop strong strategic partnerships.

A key conviction underlying the existence of the Centre is that the virtues that make up good character can be learnt and taught, but that these have been largely neglected in schools and in the professions. It is also a key conviction that the more people exhibit good character and virtues, the healthier our society. As such, the Centre undertakes development projects seeking to promote the practical applications of its research evidence.

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Executive Summary

Cyber-wisdom is defined in this report as the ability to do the right thing at the right time, when using online digital technologies. It is a virtue that helps users to maximise online opportunities and minimise online risks. The task of educating cyber-wisdom in children and adolescence relies on joint efforts from multiple stakeholders, including parents, teachers, policymakers, and technology companies.

Previous research conducted by the Jubilee Centre found that adolescents and parents in the UK prioritise the importance of possessing wisdom over other virtues when using the Internet and social media (Harrison and Polizzi, 2021). Given this finding, it is perhaps surprising that there have been no previous attempts to teach adolescents attending UK schools about a neo-Aristotelian informed understanding of cyber-wisdom. Furthermore, no measures for the components of cyber-wisdom education currently exist. This project sought to address this gap by carrying out a feasibility study designed to bring new understandings about the concept of cyber-wisdom, as well as how cyber-wisdom might be educated and measured.

In this report, theoretical, empirical, and practical findings about cyber-wisdom education are described. These are based on a study conducted with 1,331 13 to 16-year-olds from seven schools in England. Building on Jubilee Centre research on character education, virtue literacy and phronesis, the findings from the study reported on here include:

- The development of the world's first four-component model of cyber-wisdom education. The components are cyber-wisdom literacy, cyber-wisdom reasoning, cyber-wisdom motivation, and cyber-wisdom self-reflection.
- The development and preliminary validation of new measures for all four of the components that can potentially be used in future research.
- Findings from an evaluation of a new four-lesson taught course that aimed to educate 13 to 16-year-olds about the four components of cyber-wisdom education. Pre- and post-testing showed that pupils across the cohort scored higher in seven out of eight scales intended to measure the components of cyber-wisdom education. The positive impact of the course varied across the different schools involved in the study.

The findings in this study provide initial evidence that cyber-wisdom reasoning, reflection, and motivation can be educated through a taught course integrated into the curriculum. In addition, they provide important foundations for future longitudinal research on cyber-wisdom education to be carried out on a larger scale and utilising more advanced evaluative research methodology.

1 Purpose of the Report

Whilst there has been some previous research that has made the case for adopting a character-based approach to digital citizenship education (see, for example, Harrison *et al.*, 2022) there is dearth of investigations in this area exploring the effectiveness of cyber-wisdom education as a form of digital citizenship education.

The Jubilee Centre's *Educating Cyber-Wisdom* project sought to address a gap by building on the Centre's work on *phronesis,* virtue literacy, and character education (see, for example, Jubilee Centre, 2022; Kristjánsson, 2015) in ways that apply specifically to the use of digital technologies. Two surveys conducted by the Jubilee Centre set the scene for the project, as they found that both adolescents and parents in the UK prioritise the importance of possessing wisdom, over other virtues, when using the Internet and social media (Harrison and Polizzi, 2021). This study sought to bring new understandings to how cyber-wisdom might be understood, educated, and measured.

Building on the Jubilee Centre's research on character education and *phronesis,* an extensive literature review was carried out to prepare the groundwork to develop a new theoretical four-component model of cyber-wisdom education. The components of cyber-wisdom are described in section 2 of this report. Having developed the model, the research team then set out to answer the following research questions:

- ■ **RQ1:** Can new measures of the components of cyber-wisdom be developed?
- ■ **RQ2:** What is the influence of the *Educating Cyber-Wisdom* taught course on 13 to 16-year-olds' cyber-wisdom literacy, motivation, reasoning, and self-reflection?

The study followed the evolutionary evaluation model (Brown-Urban, Hargraves and Trochim, 2014). According to this model, evaluation of new programmes follows evolutionary phases, which are in turn aligned with multiple types and degrees of validation. As this was the first known attempt to cultivate and measure the four components of cyber-wisdom, the goal for the research was to lay the foundations for future longitudinal research on cyber-wisdom education. Between September 2021 and March 2022, 1,331 participants from seven schools in England were involved with a feasibility study designed to answer these questions. Initially pupils from seven schools completed a set of adapted and new measures to test out their preliminary validity and internal reliability. This data was used to answer research question 1. Pupils from the seven schools also experienced a new taught course (described in Part 2) designed to educate them about the four components of cyber-wisdom. The course was evaluated using pre- and post-surveys. Missing post-survey data from three schools disrupted by the Covid-19 pandemic meant that data from four schools were analysed to answer the second research question.

In section five, we discuss the implications of this research and provide insights that could help inform future research and practice in the field. This report is particularly relevant to those who may be tasked with developing, implementing, and evaluating programmes of digital character education in schools that are designed to contribute to pupils' online flourishing. The overall purpose of the report is to lay the foundations for future theoretical, evaluative, and practical research that focuses on cyber-wisdom education.

2 Background

2.1 CHILDREN AND ADOLESCENTS IN THE DIGITAL AGE

Children and adolescents are at the forefront of using digital technologies. This means they are the ones to often experience both the opportunities and risks that digital technologies present far earlier than older users. On the one hand, children and adolescents enjoy opportunities for learning, socialisation, leisure, employment, and participation. On the other hand, they are also among the first users to experience issues of online abuse (e.g. cyberbullying, trolling), invasion of privacy, misinformation, and security, to name a few (Livingstone, Mascheroni and Staksrud, 2018). Even though the legal age requirement to use platforms like Facebook and TikTok is 13, in practice many children have social media profiles at a younger age, and almost all have at least one by the age of 15 (Ofcom, 2019: 19). As children and adolescents grow up, they are increasingly presented with situations that require them to navigate both the opportunities and risks that these digital technologies present.

The Internet was designed in ways that afford users the ability to transcend time and space, for example by connecting and making friends with users who live in different parts of the world. The Internet has enabled adolescents to share their views, create online communities, and get together to discuss and take action on issues that they value – including, for example, issues relating to social justice or the environment. The Internet was also designed in a way that enables users to interact anonymously and to communicate through text in ways that are often devoid of social cues or body language. These affordances (that is, the technical features that the Internet presents) have been found to exacerbate some of the risks that are linked to the use of digital technologies, making it easier for perpetrators of online abuse, for instance, to hide behind a screen or to misjudge the impact of their own behaviour. What is more, the Internet is also largely under-regulated in line with discourses of freedom of speech and a free-market spirit. As a result, all users, and especially the younger ones, are regularly presented with situations in which they need to make moral decisions both on their own and in response to those of others – e.g. what language should they use when posting comments online to ensure that it is not offensive? What should they do when coming across instances of online abuse – should they intervene themselves or report those instances to adults and/or social media platforms? These questions make it essential for adolescents to develop character virtues such as compassion, honesty, and integrity. However, the rise in Internet use has called into question the impact it has on adolescents' development, and their ability to act, on these virtues. It follows, therefore, that virtue-based character education – which overlaps with digital citizenship education, as defined and unpacked in the next section – is not just as important as ever but, given the challenges presented by the Internet, essential in the digital age. This, in turn, raises the question of what educators – particularly in the context of formal education – should and can do to ensure that pupils are equipped with the know-how and ability to navigate online risks and opportunity wisely, responsibly and, ultimately, autonomously. This is a question that requires concerted efforts from multiple actors, including not just educators but also parents, children themselves, civil society practitioners working in areas related to the Internet, as well as tech companies, and policymakers. The task of educating character is a collective one, and as such this study focussed on the role of formal education and what schools and teachers, in particular, can do to cultivate virtues and wisdom in pupils to help them to thrive in the digital age.

2.2 DIGITAL CITIZENSHIP EDUCATION: A CHARACTER-FOCUSSED APPROACH

Digital citizenship education can be broadly defined as education that aims to teach pupils how to use digital technologies both wisely and responsibly, particularly in the context of interacting with others and, ultimately, of participating actively in society (Ribble, 2007). While this form of digital citizenship education is essential in the digital age, it is somehow surprising that it has a marginal place in the school curriculum (Polizzi and Harrison, 2020; Harrison et al., 2022). This is not to say that there is no or little useful advice on how to implement digital citizenship education by governments or civil society organisations working in education. In the UK, a useful publication is the *Education for a Connected World* framework. Provided by the UK Council for Internet Safety (2020) in partnership with organisations such as the Personal, Social, Heath, and Economic education (PSHE) Association and Parent Zone, this framework offers guidance on the skills and knowledge that children should gain in the classroom in relation to some of the key risks posed by digital technologies. What is more, the Department for Education (DfE) (2019) published specific advice on how to stay safe online and on aspects of digital citizenship – aspects that are included in the PSHE statutory modules Relationships and Sex Education and Health Education. Furthermore, recently, the Department for Digital, Culture, Media, and Sport (DCMS)[1] published an online media literacy strategy that includes a framework for what users should know in order to act as critical users of online information and interact in meaningful and positive ways with other users.

In order for children and adolescents to flourish in the digital age, they need to possess and deploy character qualities that inform the ways in which they use digital technologies to interact with each other and participate in society. This means that digital citizenship should overlap in practice with character education, which is a form of moral education. Promisingly, the Jubilee Centre has developed not only a comprehensive framework for how to promote a character approach to digital citizenship education (Harrison et al., 2022), but also, as part of its wider primary and secondary curricula, lesson plans and teaching resources aimed at cultivating character virtues in students[2]. Similarly, character education represents a central component of the educational work of civil society organisations such as Common Sense Media, which has designed award-winning resources for teaching digital citizenship that are used by millions of educators around the world[3]. What is more, international bodies such as the Council of Europe (2019) have also developed resources to promote both a competencies and a character approach to digital citizenship education. However, despite the sheer amount of guidance and resources produced by government bodies and civil society, provision of this form of education remains at the discretion of schools and is far from cohesive. As a result, according to a recent Organisation for Economic Cooperation and Development (OECD) report (Burns and Gottschalk, 2020: 46), promotion of this form of

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[1] See www.gov.uk/government/publications/online-media-literacy-strategy

[2] See www.jubileecentre.ac.uk/thecharactercurriculum

[3] See www.commonsense.org/education/digital-citizenship

education is largely perceived across countries in the world, including the UK, as the most important global challenge of the digital age, covering both issues of digital inequalities and the tackling of online risks such as cyberbullying.

In practice, many schools in the UK employ strategies to teach adolescents some elements of moral and character education through the teaching of digital citizenship. Indeed, most schools teach some form of digital citizenship education through assemblies, PSHE, citizenship, and computing classes, as well as through communications and advice to parents. However, despite multiple sources of advice and resources, there is no formalised curriculum that schools are required or expected to follow; which is why digital citizenship education is largely taught by schools in reaction to the challenges posed by the Internet and not through a cohesive, planned or reflective approach (Polizzi and Harrison, 2020). The Jubilee Centre argues that a more comprehensive and effective approach to digital citizenship education is needed – one that should be grounded more robustly in neo-Aristotelian character education based on virtue ethics. Put differently, it is through a focus on the importance of possessing and showing different virtues online, and what the Centre refers to as cyber-wisdom (see below), that schools may be better equipped to cultivate qualities in their pupils that will enable them to flourish in the digital age (Dennis and Harrison, 2021; Harrison, 2016; Harrison and Polizzi, 2021). This approach can be considered a form of digital character education.

2.3 PROBLEM STATEMENT AND CONCEPTUAL CLARIFICATIONS

2.3.1 Moral Theory in the Digital Age
This report describes and discusses the key findings from an evaluation by the Jubilee Centre of a school intervention using a cyber-wisdom education programme – conceived in ways that overlap with digital citizenship education – in secondary schools in England. In the absence of a coherent approach to digital citizenship education, many schools turn to strategies that prioritise deontological or utilitarian approaches over virtue-based character education. These approaches are based respectively on imposing rules or restrictions and on encouraging students to be mindful of the consequences of their own online actions. Many schools, for example, seek to ban or restrict mobile phone use during and/or in-between classes, with teachers instructing pupils to respect rules of moral conduct (Humble-Thaden, 2011; Selwyn and Aagaard,

2021). For example, the term *netiquette* is widely used in schools, which is an example of how deontology legitimises the use of rules and norms to dictate what may (or not) be considered appropriate behaviour online. At the same time, utilitarian or consequentialist strategies are based on encouraging children to reflect on the possible repercussions of their online behaviour. This is why schools might show students films about the effects of cyberbullying on adolescents' mental or physical wellbeing, or about the consequences of sexting (e.g. Morgan, 2013).

While these approaches are important and should be part of a more comprehensive approach to digital citizenship education (see Harrison *et al.,* 2022), what is unclear is whether they are sufficient to prepare children and adolescents to use digital technologies responsibly (Vallor, 2016; Dennis and Harrison, 2021; Harrison and Polizzi, 2021). That is, to what extent do rules about digital technologies register with children and adolescents and how likely are they to consider the negative consequences that may result from their temporally distant actions? What is more, research conducted in 2021 by the Jubilee Centre revealed that both parents and adolescents aged 13-16 in the UK prioritised virtue-based over deontological or consequentialist reasoning to justify, respectively, their parental mediation strategies and use of the Internet (Harrison and Polizzi, 2021). More specifically, the Jubilee Centre found that the explanations that most adolescents provided in support of undertaking morally engaged reactions to an abusive post online (e.g. 'send a nice message to the person insulted to check how they feel') were virtue-based (68%) (e.g. 'because it is the kind/thoughtful thing to do' (37%)), as distinct from utilitarian (21%) (e.g. 'because the same thing might happen to me' (13%)), or deontological (11%) (e.g. 'because of the rules of the social media company' (6%)). More significantly, presented with a list of virtues (including, for example, compassion, honesty and resilience), most adolescents reported wisdom to be the virtue that they wanted their friends to show the most on social media, with 38% choosing this as one of their top two desired qualities. Similarly, wisdom was also reported as the virtue that parents most wanted their children to show online, with 56% choosing this as one of their top two qualities.

2.3.2 Educating Cyber-Wisdom
Cyber-wisdom – i.e. doing the right thing at the right time when online, particularly when no-one is watching – stems from the Aristotelian concept of *phronesis* in ways that apply to the online world

(Harrison, 2021). Like the term *phronesis,* which is often translated as practical wisdom, the concept of cyber-wisdom presents features the need to be attuned to the demands of our contemporary societies and, in the case of cyber-wisdom, to the digital age in which we live. It builds on considerable interest and research on the virtue of wisdom in recent philosophical and psychological scholarships (including notably: Schwartz and Sharpe, 2010; Kristjánsson, 2015; Darnell *et al.,* 2019). Of particular significance is an article by Grossmann *et al.* (2020), that seeks to develop a unified understanding of wisdom for the contemporary age.

Building on both moral philosophy and moral psychology, the Jubilee Centre refers to cyber-wisdom as a complex and multi-component construct that has the potential to enable children and adolescents to navigate the moral implications of online risks and opportunities (Polizzi and Harrison, 2020). Cyber-wisdom can only come into play as a meta-virtue when other virtues are involved. As classified by the Jubilee Centre (2022), these include moral (e.g. compassion), civic (e.g. supporting social justice), intellectual (e.g. independent thought), and performance virtues (e.g. resilience). Cyber-wisdom functions as a meta-virtue that coordinates all other virtues. In short, it is the quality of knowing what the acceptable course of action may be in any given online situation. Like *phronesis* (but unlike the intellectual virtue of *sophia,* which refers to wisdom in theoretical terms), cyber-wisdom is not concerned with the universal, but relates to the application of practical reasoning in specific online situations. As such, it requires putting moral judgements about online conduct into practice with the goal of enhancing online behaviour. Relatedly, it is a human quality that is honed over time through experimentation and critical reflection on action. That is, cyber-wisdom is a quality that is refined through experience of using the Internet, making mistakes and learning from these.

2.3.3 Introducing the Four-Component Model of Cyber-Wisdom Education
The educational programme and measures designed to evaluate cyber-wisdom that are reported on here, draw on a four-component understanding of cyber-wisdom and how this can be developed through formal education. In terms of their educational implications these components build on Jubilee Centre research on character education, virtue literacy, and *phronesis.* The components are also grounded in neo-Aristotelian virtue ethics and closely related to three prominent existing models of wisdom

(Ardelt, 2004; Darnell *et al.,* 2019; Grossmann *et al.,* 2020). A comprehensive overview of how the four components of cyber-wisdom have been developed can be viewed in an extended article written by Polizzi and Harrison (2022). The argument offered in the article was that the four components are essential for navigating online risks and opportunities, and necessary for flourishing online. The four components of cyber-wisdom education are: cyber-wisdom literacy; cyber-wisdom reasoning; cyber-wisdom self-reflection; and cyber-wisdom motivation. Unlike the models of wisdom from on which it is founded, these components account for the specificity of the digital age and are both conceptual and practical. On the one hand, each component has conceptual implications for what it means to be wise in the digital age. On the other hand, informed by character-education literature and practice, the model has practical implications for how to cultivate cyber-wisdom in the classroom through teaching methods that match the different components of cyber-wisdom. The theoretical and practical basis for each of the four components is explored below.

Cyber-Wisdom Literacy

Cyber-wisdom literacy refers to an understanding of different virtues such as honesty and compassion and how these may apply to different contexts that relate to the use of digital technologies. As such, cyber-wisdom literacy resonates with previous models of wisdom that, while not necessarily mindful of the opportunities and challenges presented by digital technologies, have provided valuable insights into the concept of wisdom. More precisely, this component echoes moral psychologist Ardelt's (2014) component of cognition, which, central to her model of wisdom, refers to knowledge of the ethical implications of different events. At the same time, cyber-wisdom literacy also resonates with Darnell *et al.'s* (2019) and Kristjánsson *et al.'s* (2021) constitutive function of *phronesis.* Grounded primarily in Aristotelian virtue ethics, their model suggests that cognition is essential for understanding which virtues may apply to different events.

Unlike these models, however, cyber-wisdom literacy is concerned specifically with the digital age. As a result, not only does it require an understanding of the virtues that may apply to different online contexts, but that such an understanding needs to be mindful of how to maximise online opportunities while minimising online risks. To give an example, cyber-wisdom literacy may involve understanding the benefits of accessing online information in ways that are driven by virtuous curiosity, while also reducing the spread of online misinformation by sharing content in line with principles of honesty. With this in mind, teaching cyber-wisdom literacy could rely on the use of narratives and stories aimed at encouraging students to develop an understanding of the role of different virtues

online. As such, this component builds on how the concept of virtue literacy (i.e. knowledge of when to deploy different virtues) may be taught in the classroom, according to the Jubilee Centre (2022). The advantages of using narratives and stories for teaching moral character are indeed well-established (see, for example, Arthur *et al.,* 2014; Carr and Harrison, 2015). This means that teachers could use real stories of virtuous practice based on online opportunities (e.g. online communities promoting solidarity) as well as stories of online harm in order to teach students about the importance of showing different virtues online. Relatedly, this also means that cyber-wisdom literacy could be taught alongside digital literacy.

Cyber-Wisdom Reasoning

Cyber-wisdom reasoning refers to the ability to evaluate and prioritise different virtues online and in the context of using digital technologies, especially when these virtues clash depending on context. As such, this component builds on perspectival meta-cognition that is crucial to the model of wisdom proposed by moral psychologists Grossman *et al.* (2020). At the same time, cyber-wisdom reasoning builds on Darnell *et al.'s* (2019) and Kristjánsson *et al.'s* (2021) integrative function of *phronesis,* which is concerned with the evaluation of events, especially when these present moral dilemmas. Cyber-wisdom reasoning, however, is rooted in the recognition that moral dilemmas online may be exacerbated by the affordances of the Internet. Examples of such dilemmas may include accessing online information free of charge versus observing copyright laws, or whether or not to show respect for perpetrators of online abuse.

This means that users can only exercise cyber-wisdom reasoning as long as they account for the ways in which dealing with moral dilemmas may be different online than offline. This suggests that, while drawing on past experiences offline may be helpful for making informed decisions online, users need to draw primarily on their experience of using digital technologies. With this in mind, a useful way to teach cyber-wisdom reasoning could be to have classroom discussions aimed at encouraging students to evaluate online dilemmas both hypothetically and those that they may have experienced. As such, this component echoes how the concept of virtue reasoning (i.e. deliberation aimed at deciding which virtues to deploy) may be taught via formal education (Jubilee Centre, 2022). Character-education research has shown indeed that asking students to discuss ethical dilemmas contributes to their ability to deploy moral reasoning to choose the best course of action in a given situation (Harrison *et al.,* 2018; Hedayati-Mehdiabadi *et al.,* 2020).

Cyber-Wisdom Motivation

Cyber-wisdom motivation refers to a desire to act on different virtues, both online and in ways that relate to use of digital technologies, in line with a vision of the digital world. Conceived as such, it builds on Grossmann *et al.'s* (2020) component of moral aspirations, understood as an orientation towards the common good. In addition, it builds on Darnell *et al.'s* (2019) and Kristjánsson *et al.'s* (2021) blueprint component of *phronesis.* In this component the primary motivation for virtuous action comes from discrete moral virtues; the blueprint component adds a secondary motivation to be a certain kind of person. It refers to the motivation required to adjust one's behaviour to be in line with the moral characteristics to which we aspire, such as being brave or temperate.

More specifically, possessing cyber-wisdom motivation means that users' moral aspirations could include, for instance: expecting users to interact online honestly and compassionately; expecting online communities to voice their concerns while also respecting a degree of civility; or expecting Internet corporations and policymakers to make more efforts to redesign the digital environment in line with virtuous principles of transparency and accountability. With this in mind, cyber-wisdom motivation could be taught through the use of stories and discussions about exemplars and role models aimed at encouraging students to cultivate moral aspirations that may apply to different online contexts. As such, this component echoes how virtue identity (i.e. a commitment to showing virtues) and virtue motivation (i.e. a desire to act on virtues) may be taught in the classroom (Jubilee Centre, 2022). Indeed, the benefits of this teaching method for promoting character education are well-documented in the literature (see, Zagzebski, 2017). This means that teachers could draw, for example, on exemplars of online activism committed to campaigning against cyberbullying, including activists such as Lizzie Velasquez.

Cyber-Wisdom Self-Reflection

Cyber-wisdom self-reflection refers to the ability to navigate one's own perspectives and those of others as well as one's own emotions and those of others in the context of using digital technologies. This component builds partly on Ardelt's (2004) component of reflection and on Grossmann *et al.'s* (2020) component of Perspectival Meta-Cognition (PMC), both of which require a commitment to self-examining events from multiple perspectives. In addition, it builds on Darnell *et al.'s* (2019) and Kristjánsson *et al.'s* (2021) emotional regulation component of *phronesis,* which refers to the ability to regulate one's own emotions. For example, a person who seeks to develop their good character might not always succeed in acting virtuously (e.g. if they act on emotional impulses). Self-reflection allows us to learn from our experiences and consider the degree to which our behaviour was oriented

towards our moral blueprint. Through practicing self-reflection, we habitually become more likely to act virtuously in challenging online contexts rather than on emotional impulse.

Mindful of the nature of the digital age, this component requires users to reflect on their own and other users' biases and navigate their own and other users' emotions when dealing with moral dilemmas online (e.g. in contexts of polarisation or when managing feelings of anger in the context of interacting with users who perpetrate online abuse). This is why cyber-wisdom self-reflection could be taught by asking students to keep journals and diaries, which is a method that is beneficial for encouraging students to develop character, through self-reflection, from their own practices and experiences (Arthur *et al.,* 2016). As such, this component resonates with how the concept of virtue emotions (i.e. the practice of navigating emotions related to different virtues) may be taught in the classroom, as suggested by the Jubilee Centre (2022). More specifically, students could be asked to write in order to reflect on the moral implications, biases, and emotions of their own online experiences.

2.3.4 Past Interventions: Gaps and Limitations
Despite the importance of cyber-wisdom education, there is a lack of research on this topic. What is lacking is research that investigates moral decision-making online through a virtue ethical lens. Relatedly, even though a few studies, as reviewed in this section, have offered insights into the benefits and challenges of implementing forms of digital citizenship education, what is lacking are interventions and evaluations of interventions that promote a character approach to digital citizenship education. Placing emphasis on the importance of cultivating character virtues and cyber-wisdom in pupils, the research reported on here fills this gap.

Broadly speaking, research that evaluates interventions that are relevant to the promotion of digital citizenship education has focused primarily on students' acquisition of skills and knowledge in relation to their moral behaviour online. As such, most of this research, which is limited but growing, has often approached digital citizenship education with emphasis on digital literacy, while focusing most prominently on issues of cyberbullying and, relatedly, mental health and prosocial behaviour. Adopting a quasi-experimental design, research in this area has hardly adopted a specific moral theory lens as the foundation of its evaluations. What is more, there is a dearth of research taking place specifically in the UK.

Bickham *et al.* (2021), for instance, have examined the effectiveness of a middle school programme in the US aimed at developing students' digital social skills and knowledge of concepts related to digital citizenship, with emphasis on their mental health and prosocial interactions online. Their study concluded that, after taking the programme, students were more likely to develop digital social skills and an understanding of the importance of conflict resolution online without necessarily altering their behaviour. Meanwhile, evaluating the implementation of a digital citizenship curriculum among adolescents in Mexico and Peru, Magis-Weinberg (2021) concluded that the curriculum was effective in encouraging students to establish and solidify healthy relationships online during the Covid-19 pandemic.

Similarly, Lee *et al.* (2013), evaluating a cyberbullying programme aimed at promoting digital citizenship among high school students in Taiwan, found that the programme enhanced students' knowledge of cyberbullying. More specifically, the programme enabled students to appreciate rules of online behaviour (i.e. what is commonly referred to as *netiquette*), while also reducing their intentions to engage in cyberbullying behaviour. Lee and colleagues' findings, however, were not statistically significant, nor was their focus on *netiquette* linked with moral theory and, in particular, with deontology, which prescribes the nature of moral behaviour on the basis of following rules.

Meanwhile, Vlaanderen *et al.* (2020) evaluated an anti-cyberbullying programme that was delivered to students aged 10-12 years in the Netherlands. What they found is that the programme contributed to students' knowledge about cyberbullying and the natural intention to intervene on behalf of victims. On the one hand, children were encouraged to understand the possible consequences of their online action and to develop empathy. On the other hand, neither the programme nor its evaluation was underpinned by an explicit link with the moral theory of utilitarianism, which is based on encouraging reflection on the repercussions of one's own actions, or of virtue ethics, according to which empathy is one among many virtues that are crucial to human flourishing.

2.3.5 Introducing the *Educating Cyber-Wisdom* Taught Course
An aim of this study was to evaluate how 13 to 16-year-olds might be introduced to the four components of cyber-wisdom education. We sought to discover the likely influence of a taught course on their cyber-wisdom literacy, motivation, reasoning, and self-reflection. Given the well-known constraints of accessing curriculum time for a digital citizenship education course in England, it was decided that the feasibility study would consist of four one-hour lessons that could be integrated into different subjects including computer science, PSHE, or citizenship education lessons. It was recognised from the outset that this would be insufficient time to fully explore all the cyber-wisdom components and ideally extended curriculum time, over several academic years, would be preferable.

The teaching materials used for delivering the cyber-wisdom taught course were designed by the research team and then piloted in three secondary schools in England. Recruited via word of mouth thanks to contacts known to the Jubilee Centre, these teachers tested elements of the materials during their regular classes with students. Based on their feedback, the materials were then revised to ensure that they were both age-appropriate for students aged 13-16 and easy to use by teachers who would then deliver the programme as part of the intervention. Once the teaching materials were revised, they comprised the following elements:

Lesson Plans
These consisted of a total of four one-hour lessons. Each lesson plan outlined the objective of each lesson. The lesson plans presented the activities that were part of each lesson, while also specifying which resources were to be used for each activity (see 'Resource Pack' below), as well as key vocabulary. Initially, the research team thought of designing a lesson per component of cyber-wisdom. While designing the materials, it became evident, however, that, since the components of cyber-wisdom are distinct theoretically but overlap in practice, tapping into multiple components through each lesson was not just beneficial but often necessary.

With this in mind, Lesson 1 comprised a total of three main activities aimed at encouraging students to reflect, after discussing key vocabulary, on the virtues that apply to a real story of online abuse. This was followed by an activity asking students to complete a diary entry designed to let them reflect about their own perspectives and emotions in relation to the story. As such, building on literature that has focussed on how to teach character education (e.g. Harrison, 2016; Dennis and Harrison, 2021), Lesson 1 was designed to connect to the components of cyber-wisdom literacy and cyber-wisdom self-reflection.

Comprising a total of three main activities, Lesson 2 was designed with a view to familiarising students with the concept of moral exemplar. This lesson focused on activist Lizzie Velasquez, with emphasis on how she has handled online trolling as part of her activism. After watching a video about her, students were asked to reflect on the motivations that underpin her activism. Finally, they were provided with a handout and asked to describe their own 'digital exemplar' – someone real or made up who uses the Internet to make a positive difference to others. Conceived in this way, this lesson was designed to build on character education literature focusing on the use of moral exemplars in the classroom (see, e.g. Harrison, 2016; Dennis and Harrison, 2021) in order to tap primarily into the component of cyber-wisdom motivation.

Lesson 3 consisted of a total of three main activities designed to familiarise students with the notion of moral dilemmas and to encourage them to use reasoning to reflect on the best course of action in morally challenging situations. Students were asked to discuss a number of hypothetical dilemmas, relating to issues ranging from online plagiarism to online abuse, and then to discuss options in terms of what the best course of action might be in relation to those dilemmas. Finally, students were asked to fill in a diary entry prompting them to reflect on their own perspectives and emotions involved in a moral dilemma relating to their own use of digital technologies. As such, building on relevant literature (e.g. Harrison, 2016, 2021), this lesson was designed to draw from the components of cyber-wisdom reasoning and cyber-wisdom self-reflection.

Comprising three main activities, Lesson 4 was designed to encourage students to reflect on the digital world, the moral dilemmas that this presents, as well as the responsibilities of different actors – ranging from governments and tech companies to teachers, parents, and users themselves – in terms of what should be done to make the digital world a better place. Students were then asked to prepare short presentations and mind maps about their own ideal digital world. Conceived in ways that build on relevant literature (e.g. Harrison, 2016, 2020), this lesson was designed to primarily link up with the components of cyber-wisdom motivation and cyber-wisdom reasoning.

Resource Pack and PowerPoint Slides
The lesson plans were accompanied by a resource pack, including all the teaching materials and handouts to be used when delivering the programme, as well as PowerPoint slides per each lesson. More specifically, the resource pack included, for example, a handout for students that presented a news story about online abuse, followed by a section with questions about the story. In addition, among other resources, it included: a glossary with key vocabulary; handouts with sentence starters and keywords for students with learning difficulties; diary entry forms designed to encourage students to reflect on their own online experiences; a form with questions titled 'my ideal digital exemplar'; and a handout with hypothetical moral dilemmas and questions relating to the use of digital technologies. Meanwhile, the PowerPoint slides were designed to provide visual support to some of the key terms, questions, and hypothetical dilemmas explored during the lessons, as well as to provide teachers with access to the videos used as part of the lessons, as in the case of the video about Lizzie Velasquez, which was embedded in the slides.

2.4 OVERALL EVALUATIVE GOALS

The overall evaluative goal for the research was to determine the feasibility of designing, implementing, and evaluating an educational intervention that utilises a new four-component model of cyber-wisdom. A related objective was to create and test out a new set of measures that could be used in future research in the field of cyber-wisdom education.

With these objectives in mind, this report addresses the following research questions:
■ RQ1: Can new measures of the components of cyber-wisdom be developed?
■ RQ2: What is the influence of the *Educating Cyber-Wisdom* taught course on 13 to 16-year-olds' cyber-wisdom literacy, motivation, reasoning, and self-reflection?

The findings from this feasibility study aimed to provide a potential road map for both research and practitioners concerned with the education of the character virtues that adolescents need to thrive in the digital age. Given that this was the first known attempt to cultivate and measure the four components of cyber-wisdom, the modest goal for the research was to lay the foundations for future longitudinal research on cyber-wisdom education that may be carried out on a larger scale and utilising more advanced evaluative research methodology. The findings from this research will: i) provide insights into the likely effectiveness of adopting a cyber-wisdom approach on the promotion of character-enhanced approaches to digital citizenship education; and, ii) inform any future intervention studies in this area.

3 Methodology

Subsections 2.1 to 2.3.5 introduce a new four-component model for cyber-wisdom education, along with discussion on how it can be cultivated via formal education, and more specifically through a new taught course designed to educate 13 to 16-year-olds about each of the components. This section reports on the methods employed to conduct an initial validation of new measures for each of the four components, and to conduct an evaluation of the taught course.

3.1 RATIONALE

Given that the cyber-wisdom taught course and associated measures were new, it was decided that a feasibility study was required to establish if they showed promise. In developing the methodology for the study, we followed the 'evolutionary evaluation' (Brown-Urban et al., 2014) model. In this model, evaluation of new programmes follows evolutionary phases, which are in turn aligned with multiple types and degrees of validation. The model anticipates that there is often misalignment between an intervention and type of evaluation, such as conducting a randomised control trial on an intervention in its infancy. The evaluation of the cyber-wisdom intervention was classified to be between the initiation and development stages in the model (see Figure 1).

Following the evolutionary evaluation model, the rationale for the present study was to establish the theory-measurement congruence (i.e. model fit), internal consistency, and overall viability of a new set of measures for possible use in more advanced and sophisticated evaluations. A second aim was to see if these measures helped to evaluate the influence of the taught course on the pupils who experienced it.

3.2 RESEARCH INSTRUMENTS

The scales used for the study were largely adapted from the Darnell et al. (2022) measure of *phronesis*. This decision was taken as the *phronesis* measure was designed to map onto the four-component model of *phronesis*, which in turn was an important inspiration for the cyber-wisdom education four-component model. As in Darnell et al. (2022), the initial survey, in the form of a questionnaire, was designed by the research team to measure aspects of each of the four components of cyber-wisdom education by drawing on and adapting existing measures (see below). After the initial survey had been developed, a pilot study was conducted with three schools and around 100 pupils to test if the

Figure 1: Program and Evaluation Evolutionary Phase Definitions (Brown-Urban et al., 2014: 129)

Program Evolution		Phase	Evaluation Evolution	
Initiation	Program is *initial implementations(s)*, either as a brand new program or as an adaptation of an existing program.	I-A	Examines *implementation, participant and facilitator satisfaction*. Uses process and participant *documentation* and assessment and *post-only evaluation of reactions and satisfaction*.	**Process & Response**
	Program still undergoing *rapid or substantial change/adaptation* or revision, after initial trails.	I-B	Focuses on *implementation*, and increasingly on *presence or absence of selected outcomes*. Evaluation is *post-only*; outcome measures may be under development with attention to internal consistency (reliability).	
Development	*Scale and scope of revisions or changes/adaptations are smaller*; most program elements are still evolving while a few may be implemented consistently.	II-A	Examines *program's association with change in group outcomes*, for these participants in this context. Uses *unmatched pre- and post-test of outcomes*, quantitative/qualitative assessment of change, assessment of measure reliability and validity.	**Change**
	Most program elements are implemented consistently; minor changes may still take place as some elements may still be evolving.	II-B	Examines *program's association with change in group (and/or individual) outcomes*, for these participants in this context. *Uses matched pre- and post-test of outcomes*, quantitative/qualitative assessment of change, verifying measure reliability and validity.	
Stability	*Program is implemented consistently*; participant experience from one implementation to the next is relatively stable (formal lessons or curricula exist).	III-A	Assesses *effectiveness* using design and statistical controls and comparisons (*control groups, control variables or statistical controls*).	**Comparison & Control**
	Program has *formal written procedures/protocol* and can be implemented consistently by new well-trained facilitators.	III-B	Assesses *effectiveness* using *controlled experiments or quasi-experiments* (*randomised experiment; regression-discontinuity*).	
Dissemination	Program is being *implemented in multiple sites*.	IV-A	Examines *outcome effectiveness across wider range of contexts*. Multi-site analysis of integrated large data sets over multiple waves of program implementation.	**Generalisability**
	Program is *fully protocolised and is being widely distributed*.	IV-B	Formal assessment across multiple program implementations that enable general assertions about this program in a wide variety of contexts (e.g., meta-analysis).	

survey was fit for the purpose of the study. The primary purpose of this pilot was to determine the suitability of the questions with a particular focus on language comprehension, as well as to see whether the questions would likely elicit meaningful responses. The aim was not to explore the validity and reliability of the measure as this was a purpose of the feasibility study described in the report. After the pilot, the survey was adapted in several ways. Some questions were removed whilst the language of others was adapted. These decisions were primarily made after a consideration of response rates, missing data, and any ceiling and floor effects.

The final survey used for the pre- and post-testing was the same. Once the survey had been revised as a result of the pilot, it included the following measures:

ID and Socio-Demographic Questions

The first few questions asked in the survey were designed to let pupils self-generate a unique ID number that was used to match their responses to the pre- and post-surveys without being identifiable. These questions included: 'what is the name of your school?', 'what class are you in?', 'what is the first letter of your forename?', 'what is the first letter of your surname?', 'how many brothers/half-brothers do you have?' and 'how many sisters/half-sisters do you have?'. Pupils were then asked three questions about their age, gender, and time spent using the

Internet on an ordinary day. This last question, which included eight responses ranging from 'little or no time' to 'more than 5 hours', was adapted from the Global Kids Online survey (2021).

Cyber-Wisdom Literacy

To assess pupils' cyber-wisdom literacy (i.e. their understanding of the ways in which different virtues may apply to specific contexts that relate to the use of digital technologies), the same general approach as Darnell et al. (2022) was used to measure virtue literacy. Thoma et al.'s (2013) adolescent intermediate concept measure (AD-ICM) was adapted with a view to presenting pupils with a short story, followed by a question that asked them to select and rank up to four of the virtues that were most relevant to the story. Pupils were presented with the story of a fictional character called Anna, who finds out that her friend Rachel has been sending nasty messages online to one of her classmates, Irene. Anna is asked by their teacher who might be responsible and does not know what to do. Pupils were asked to choose from a list of eight virtues – i.e. honesty, compassion, justice, integrity, loyalty, humility, respect, and courage. According to their relevance to the story, these eight virtues were first ranked by an expert panel of eight members, including academics and teachers with expertise in the field of character education. The virtues were ranked by the panel in the following order: 1) integrity, 2) compassion, 3)

honesty, 4) courage, 5) respect, 6) loyalty, 7) justice, and 8) humility.

Cyber-Wisdom Reasoning: i) Dimensions of Wise Reasoning; and ii) Moral Engagement

Utilising the same story, pupils were then asked two questions designed to measure their cyber-wisdom reasoning, which refers to the ability to choose the best course of action in the context of using digital technologies, especially when one or two virtues clash depending on context. The first question was adapted from Brienza et al.'s (2018) situated wise reasoning scale (SWIS), which was also used to measure moral adjudication in Darnell et al. (2022). While the original scale includes 20 items (four per dimension), the items used were reduced to one per dimension so as to ensure that the questionnaire did not take too long to complete, which was deemed essential for maximising response rates. What is more, the items used were reworded to match the story that pupils were presented with. The items included: 'I would put myself in the shoes of the other people involved in the story (e.g. Rachel, Irene, Mr Smith)' (dimension 1: recognition of other perspectives); 'I would look for different solutions as the situation unfolds (e.g. talking to my parents, talking to Mr Smith, talking to Rachel, talking to Irene)' (dimension 2: consideration of change and multiple ways a situation may unfold); 'I would double check whether my opinion and the opinions of the other people involved in the story (e.g. Rachel, Irene, Mr Smith) are correct' (dimension 3: intellectual humility); 'I would try to see the situation from the point of view of people not involved in the story (e.g. other students, parents, teachers)' (dimension 4: view of an event from the vantage point of an outsider); and 'I would view it as very important that the situation is resolved (e.g. hoping that Rachel decides to apologise while Mr Smith and Irene's parents decide not to suspend Rachel or call the police)' (dimension 5: consideration of compromise/conflict resolution). Pupils were asked to rate each item from 1 ('I strongly believe this is a bad choice') to 5 ('I strongly believe this is a good choice'). Since all items described actions that Anna could take to resolve the situation, pupils were expected to score more highly on each item after taking the programme.

Adapted from Thoma et al.'s (2013) AD-ICM, the question that followed asked pupils what Anna should do, in order to determine levels of moral engagement. Again, unlike the original measure, the items in response to this question were reduced to six and adapted to the story. Asked to rate each item using a five-point scale ranging from 'I strongly believe this is a bad choice' to 'I strongly believe this is a good choice', pupils were presented with the following items: 'Even though Anna doesn't like the messages that Rachel has sent, Anna should say or do nothing and mind her own business'; 'Anna should tell Mr Smith that it's

her best friend Rachel who has been sending nasty messages to Irene'; 'Since Anna has never really liked Irene, she should support her best friend Rachel by also sending nasty messages to Irene'; 'Anna should talk to Rachel first and see whether she will apologise to Irene or tell Mr Smith on her own, and should tell the truth if Rachel doesn't'; 'Even though Anna doesn't like the messages that Rachel has sent to Irene, she should protect her best friend Rachel and be ready to lie in her defence, if necessary'; and 'Anna should talk to her parents or to other close friends and seek their advice'. Items in response to this question were classified as either morally engaged actions (e.g. 'Anna should talk to her parents or to other close friends and seek their advice') or morally disengaged actions (e.g. 'Since Anna has never really liked Irene, she should support her best friend Rachel by also sending nasty messages to Irene'), with the latter items being reverse-coded.

Cyber-Wisdom Motivation: i) Ideal Digital World; and ii) Moral Reasons

This component of cyber-wisdom education, which refers to a desire to act with virtues in line with a vision of the digital world, was measured through two questions. Both these questions were newly developed for the purposes of this study. Of these, the first question was designed to tap into pupils' visions of their ideal digital world and of the responsibilities of different actors (i). The other was designed access pupils' moral reasons (ii) behind the ways in which they use the Internet and social media. More specifically, the first question asked pupils to use a five-point scale ranging from 'I really disagree with this statement' to 'I really agree with this statement' to rate items such as 'In my ideal digital world, people are kinder and show more respect to each other online'. Pupils taking the programme were excepted to be more likely to agree with the statements that were worded positively (e.g. 'In my ideal digital world, Internet companies (e.g. Google, Facebook) act more promptly to solve problems such as misinformation and online abuse (e.g. bullying, trolling).'), and to disagree with the statements that were worded negatively (e.g. 'In my ideal digital world, the government doesn't have a responsibility to address problems such as misinformation and online abuse (e.g. bullying, trolling).').

Meanwhile, the second question asked pupils to use a five-point scale ranging from 'not important to me' to 'extremely important to me' to rate nine items, categorised as deontological, virtue ethical, and utilitarian reasons for how they use digital technologies, with three items per category. In response to the question, which was worded as 'How important is it to you that you…?', examples of items included: '…follow your parents' rules when using the internet (e.g. by not communicating with strangers on social media)?'

(deontological reason); '…are honest when communicating with others online (e.g. by not spreading misinformation)?' (virtue ethical reason); and 'think about whether what you do online might get you into trouble (e.g. posting inappropriate photos on social media)?' (utilitarian reason). As a result of experiencing the taught course, pupils were expected to be more likely to give deontological, utilitarian, and/or virtue ethical reasons for their actions. It was hoped that the change would be most pronounced in their virtue ethical reasoning.

Cyber-Wisdom Self-Reflection

Finally, to measure pupils' cyber-wisdom self-reflection (i.e. their ability to navigate, in the context of using digital technologies, their own perspectives and those of others as well as their own emotions and those of others), pupils were asked a question that was adapted from Davis's (1983) interpersonal reactivity index (IRI), which was used to measure moral emotion in Darnell et al. (2022). While the original measure incorporates four different dimensions, only two dimensions were deemed suitable for the purposes of measuring cyber-wisdom self-reflection. These dimensions included perspective taking (i.e. adoption of others' viewpoints) and empathic concern (i.e. an individual's feelings of compassion and concern for others). These dimensions were chosen because they best reflected the features of cyber-wisdom self-reflection, which requires users to use digital technologies in ways that allow them to navigate both different perspectives and different emotions. Pupils were asked to rate a total of eight items (four per dimension) using a five-point scale ranging from 'does not describe me very well' to 'describes me very well'. Not only were the items used reduced from the original measure, but were also reworded so as to relate to the use of digital technologies. Examples of items included 'I always try to look at everybody's side of a disagreement on social media before I take a position' (perspective taking), and 'When I see someone being bullied on the Internet, I feel protective towards them' (emphatic concern). As a result of taking the programme, pupils were expected to be more likely to agree with the statements that were worded positively (e.g. 'I am often quite touched by the positive things that I see on the internet (e.g. users donating money to charities)'), and to disagree with the statements that were worded negatively (e.g. 'If I'm sure I'm right about something, I don't waste much time reading through the different arguments of other people in their Internet posts'), with the latter being reverse-coded.

3.3 RESEARCH DESIGN AND PARTICIPANT INFORMATION

The sampling strategy that was adopted to recruit schools and participants was both purposive and based on convenience. More precisely, a total of seven schools were recruited using contacts known to the Jubilee Centre. Schools were selected, as shown in Table 1, with a view to maximising heterogeneity in terms of geographical location. Seven schools completed the initial survey which was used to analyse the effectiveness of the measures for the components of cyber-wisdom education as described above (Research Question 1). Pupils in years 9 and/or 10 completed the surveys either online (using Qualtrics) or in hard copy. These preliminary measurement validation surveys were also used as the pre-survey for the pupils who experienced the intervention.

As completing the four lessons and returning the pre- and post-surveys was a greater burden on schools, fewer pupils experienced the intervention than completed the preliminary measurement validation survey. Pupils from years 9 and/or 10 (chosen at the discretion of the schools) undertook the intervention and completed pre- and post-surveys. Schools were asked to deliver the cyber-wisdom taught course at a time between September 2021 and March 2022 that was most convenient for them. Schools were also free to deliver the four cyber-wisdom lessons within four sessions, or to split the lessons into more sessions. Finally, they were asked to administer the pre-survey within one week before delivery of the first lesson and the post-survey within one week after delivery of the last lesson.

Although all the schools completed the lessons with some of their year 9 and/or 10 pupils, three schools did not return a sufficient number of post-surveys to be included in the analysis for Research Question. The non or low return of post-surveys from these schools was primarily due to issues related to the Covid-19 pandemic that was causing significant disruption in schools at the time.

The decision was taken not to include schools in the analysis undertaken for Research Question 2 if there was a concern about how the intervention was delivered in the school and/or there was a high portion of missing post-survey data. This was deemed to be an appropriate decision given that this was a feasibility study, and that the results were not intended to be generalised.

Table 1: Overview of Schools and Pupils Participating in the Feasibility Study

School	Area in England	No. of survey responses included in the analysis for RQ1	Completed the intervention	No. of survey responses included in the analysis for RQ2	Questionnaire format
1	Southern England	316	September 2021 - October 2021 – four lessons delivered via PSHE	Pre: 168 Post: 86	Online
2	Southern England	120	November 2021– lessons split and delivered via PSHE and Tutor time		Online
3	Northern England	47	December 2021 - January 2022 – four lessons delivered via Physical Education	Pre: 21 Post: 21	Hard copy
4	Southern England	139	January 2022 - February 2022 – four lessons delivered via PSHE and Computing	Pre: 72 Post: 67	Hard copy
5	Midlands	402	January 2022 - February 2022 - four lessons delivered via PSHE		Hard copy
6	Midlands	101	January 2022 - February 2022 – four lessons delivered via PSHE	Pre: 62 Post: 74	Hard copy
7	Northern England	206	January 2022 - March 2022 - four lessons delivered via Curriculum for Life		Hard copy

3.4 DATA ANALYSIS

Once the data outlined in Table 1 was cleaned and organised both on SPSS (i.e. the survey data collected via Qualtrics) and on an Excel spreadsheet (i.e. the survey data collected via hard copies), it was analysed on SPSS (version 22) and STATA (version 16). In instances where over 50% of the data was missing on a survey it was removed from the analysis. For Research Question 1, the internal consistency of each component was assessed through Cronbach alpha tests. Then to see how the items mapped into the theorized cyber-wisdom model confirmatory factor analyses were performed.

Regarding Research Question 2 and assessing pupils' cyber-wisdom literacy, the virtues selected by participants were compared against those selected by experts. Students received a score of one each time their selection matched one of the four picked by the expert panel. Considering this, the maximum score a student could get was four in each time point. Then, the difference in mean scores was calculated between both points in time through independent sample T-tests. Regarding the other three components, differences between both time points were assessed after negatively worded items were corrected, neutral options (e.g. 'I 'don't know') were removed and a mean score (arithmetic) per student was calculated. Then, the means for each measure were compared through independent sample T-tests.

3.5 LIMITATIONS OF THE RESEARCH

This study presents several limitations, many of which are well known in the field of character education research as well as research that involves running evaluations in educational settings. In fact, it was in anticipation of these limitations that this study was undertaken as a feasibility trial to hopefully prepare the ground for a more advanced evaluation in the future. This is also why, in the findings section of this report, the suitability of the measures is reported on initially, before the evaluation findings are described.

The sampling strategy behind the selection of schools was non-probabilistic, but purposive and based on convenience, which means that the data is likely to contain some bias. Given that the recruitment of schools relied heavily on gatekeepers (for the most part, teachers) willing to promote the proposed study, consequently, only those initially attracted to the study took

part. Indeed, a 'self-selection' bias in sampling must be acknowledged. Furthermore, the findings cannot be reliably generalised to the broader population. Since participating schools were drawn from across England, and the intervention incorporated weekly activities, it simply was not feasible for the intervention to be delivered by the primary researcher. This means that schools were in charge of delivering the course, including whether and when the lessons were delivered either as four units in total or split into multiple sessions. It should be acknowledged therefore, that as a result teachers were de facto covariates in the research, as some may have been more committed to the aims and objectives of the course content than others. Finally, all the measures used were based on self-reporting, which may have led to issues of: 1) self-deception (i.e. participants providing inaccurate responses); 2) social desirability (i.e. participants being motivated by a desire to be viewed favourably); and 3) self-confirmation bias (i.e. participants giving answers that may please the researcher) (Weber and Cook, 1972). For example, participants in the current study might have guessed that they were involved in an intervention to enhance cyber-wisdom and they could have answered the pre- and/or post-surveys in ways that supported or undermined this belief.

3.6 ETHICAL CONSIDERATIONS

For each of the methods used in this study, ethical approval was granted by the University of Birmingham Ethics Committee. Adherence to ethical considerations was regarded as essential throughout the study, especially considering that this research was carried out with adolescents. Schools were informed about the study and a member of staff from each school was required to agree to the trial and give permission for their pupils to be involved. Letters were sent out to pupils and parents explaining the nature of the study, and parents were given the opportunity to opt their children out from being involved in the study.

4 Findings

An aim of this study was to develop survey items that can be used to measure the four components of cyber-wisdom (see RQ1). In the first part of this section, we report our findings about the preliminary validity of each of the measures described in the methodology section above. Following this, in response to RQ2, we report on the evaluation of the *Educating Cyber-Wisdom* taught course intervention.

4.1 RESEARCH QUESTION 1: CAN NEW MEASURES OF THE COMPONENTS OF CYBER-WISDOM BE DEVELOPED?

Survey data from the seven schools (*N* = 1,331) was utilised to assess the internal reliability and suitability of the new cyber-wisdom measures. This was done after the data was cleaned and prepared for analysis. The demographics of the participants who completed the baseline can be seen in Table 2 (the split between the seven schools can be seen in Table 1). It is striking to note that over 60% of the respondents stated that they used the Internet four or more hours a day.

The data from these participants was used to determine the preliminary psychometric properties of each of the cyber-wisdom measures.

Cyber-Wisdom Literacy
A single measure was designed in an attempt to measure cyber-wisdom literacy. For its calculation, respondents' answers were compared against the selection made by an expert panel. Each time a respondent agreed with the expert panel, they received a score of one. Considering this, the maximum score a student could get was four points. For this particular scale, the internal reliability was unable to be calculated because it was composed of four binary items (out of eight), and so it violates Cronbach's alpha test assumptions. In terms of response rates, 16.8% (224) of respondents marked fewer than four virtues and 4.8% (65) did not express any preference. Overall, scores appeared to be approximately normally distributed, showing no evidence of ceiling or floor effects and that scores may be amenable to change.

Cyber-Wisdom Reasoning: i) Dimensions of Wise Reasoning; and ii) Moral Engagement
Two questions were used to measure cyber-wisdom reasoning. The first question is an adapted version of Brienza *et al.'s* (2018) situated wise reasoning scale (SWIS), and it is composed of five *Dimensions of Wise Reasoning* (intellectual humility; recognition of uncertainty and change; consideration of the broader context at hand; perspectives of others; integration of these perspectives or compromise). The second question, adapted from Thoma *et al.'s* (2013) AD-ICM, tapped into pupils' levels of *Moral Engagement*.

In terms of reliability, we can observe that the *Moral Engagement* question had a Cronbach's alpha of .70 and the *Dimensions of Wise Reasoning* question had an alpha of .58. The response rates were high in both measures with a non-response rate of 2.4% for *Moral Engagement* (33) and 5.9% (79) for the *Dimensions of Wise Reasoning* question. To test how the responses mapped onto the theoretical model, a confirmatory factor analysis was performed. The model (see Appendix 1) showed an acceptable fit (*RMSEA* = .058; *TLI* = .84; *CFI* = .88*)* for this preliminary validation stage. This suggests that the eleven items across the two questions do collectively measure two different aspects of cyber-wisdom reasoning.

Cyber-Wisdom Motivation: i) Ideal Digital World; and ii) Moral Reasons
This component of cyber-wisdom education, which refers to a desire to act with virtues in line with a vision of the digital world, was measured through two questions. Of these, the first question was designed to tap into pupils' visions of the ideal digital world and the second to determine which moral reasons motivated their actions in ways that resonate with different moral theories. Following the previous trend, the response rates showed a high level of compliance (non-response rate *Ideal Digital World:* 5.4% [73]; *Moral Reasons*: 1.9% [26]). Looking at the reliability of each scale the Cronbach alpha was .75 for *Ideal Digital World* and .80 for *Moral Reasons*. Confirmatory factor analysis (see Appendix 1) showed an acceptable model fit (*RMSEA* = .07*; TLI* = .85*; CFI* = .87*)* for this preliminary validation, suggesting that the seventeen items do collectively measure two aspects of cyber wisdom motivation.

Cyber-Wisdom Self-Reflection
To measure pupils' cyber-wisdom self-reflection (i.e. their ability to navigate, in the context of using digital technologies, their own perspectives and those of others, as well as their own emotions and those of others), participants were asked a question that was adapted from Davis's (1983) interpersonal reactivity index (IRI). Similar to the other scales, the response rate was high with only 4.3% (58) of the sample not answering the full eight items. This scale showed good internal consistency, with a Cronbach's alpha of .69. As a single factor scale (see Appendix 1), an

Table 2: Participant Demographics and Time Spent Using the Internet Each Day

		N=	*N%*
Gender	Female	707	55.8
	Male	531	41.9
	Other	30	2.4
Age	13	426	32.2
	14	690	52.2
	15	205	15.5
Time spent using the Internet each day	Little or no time	11	0.8
	About half an hour	22	1.7
	About 1 hour	72	5.5
	About 2 hours	155	11.7
	About 3 hours	232	17.6
	About 4 hours	260	19.7
	About 5 hours	163	12.3
	More than 5 hours	405	30.7

excellent model fit was found *(RMSEA = .06; TLI = .92; CFI = .94)*.

Cyber-Wisdom – Overall Measure

We undertook a confirmatory factor analysis to test how well the theorized model fitted the data overall. The virtue literacy component (Q5) was left out due to its measurement limitations discussed above. When the remaining questions were entered, the resulting model had an acceptable fit *(RMSEA = .05; TLI = .85; CFI = .86)* given the preliminary nature of this study, thus allowing us to verify the internal factor structure.

4.2 RESEARCH QUESTION 2: WHAT IS THE INFLUENCE OF THE *EDUCATING CYBER-WISDOM* TAUGHT COURSE ON 13 TO 16-YEAR-OLDS' CYBER-WISDOM LITERACY, MOTIVATION, REASONING, AND SELF-REFLECTION?

To evaluate the likely influence of the four-lesson taught course on the participants who experienced it pre- and post-survey data was used. Four schools were included for this analysis. Three of the schools that completed the taught course either did not return the post-survey data or returned insufficient post-survey data to be included in the analysis. The non or low return rates are mainly explained by Covid-19 disruptions. In line with the Urban-Brown *et al.* (2014) evolutionary evaluation model, unmatched pre- and post-data was used for the analysis. The number of participants from the four schools included in the sample was 323 (pre) and 248 (post).

When considering the whole cohort, it is noticeable how on all but one of the measures (cyber-wisdom literacy) there was an increase in the pre- to post-mean scores (see Table 3 and Chart 1). Across the cohort participants slight improvements in their cyber-wisdom reasoning, motivation, and self-reflection were shown after just four lessons of the intervention. Among

these, the score for deontological reasoning showed a statistically significant increase between pre *(M = 3.18, SD = .98)* and post *(M = 3.36, SD = 1.00)* intervention times *(t [515] = -2.09, p = 0.036)*.

Table 3: Pre- and Post-Intervention Mean Scores for Each Component across the Whole Cohort

	Pre Mean	Post Mean
Cyber-Wisdom Literacy	2.27	2.15
Cyber-Wisdom Reasoning – Dimensions of Wise Reasoning	3.33	3.40
Cyber-Wisdom Reasoning – Moral Engagement	2.65	2.73
Cyber-Wisdom Motivation – Ideal Digital World	2.67	2.71
Cyber-Wisdom Motivation – Deontological	3.18	3.36*
Cyber-Wisdom Motivation – Virtuous	3.67	3.78
Cyber-Wisdom Motivation – Utilitarian	3.25	3.36
Cyber-Wisdom Self-Reflection	3.20	3.21

*= Statistically significant difference $p < 0.05$

Chart 1: Mean Score Increases in All but One of the Outcome Measures
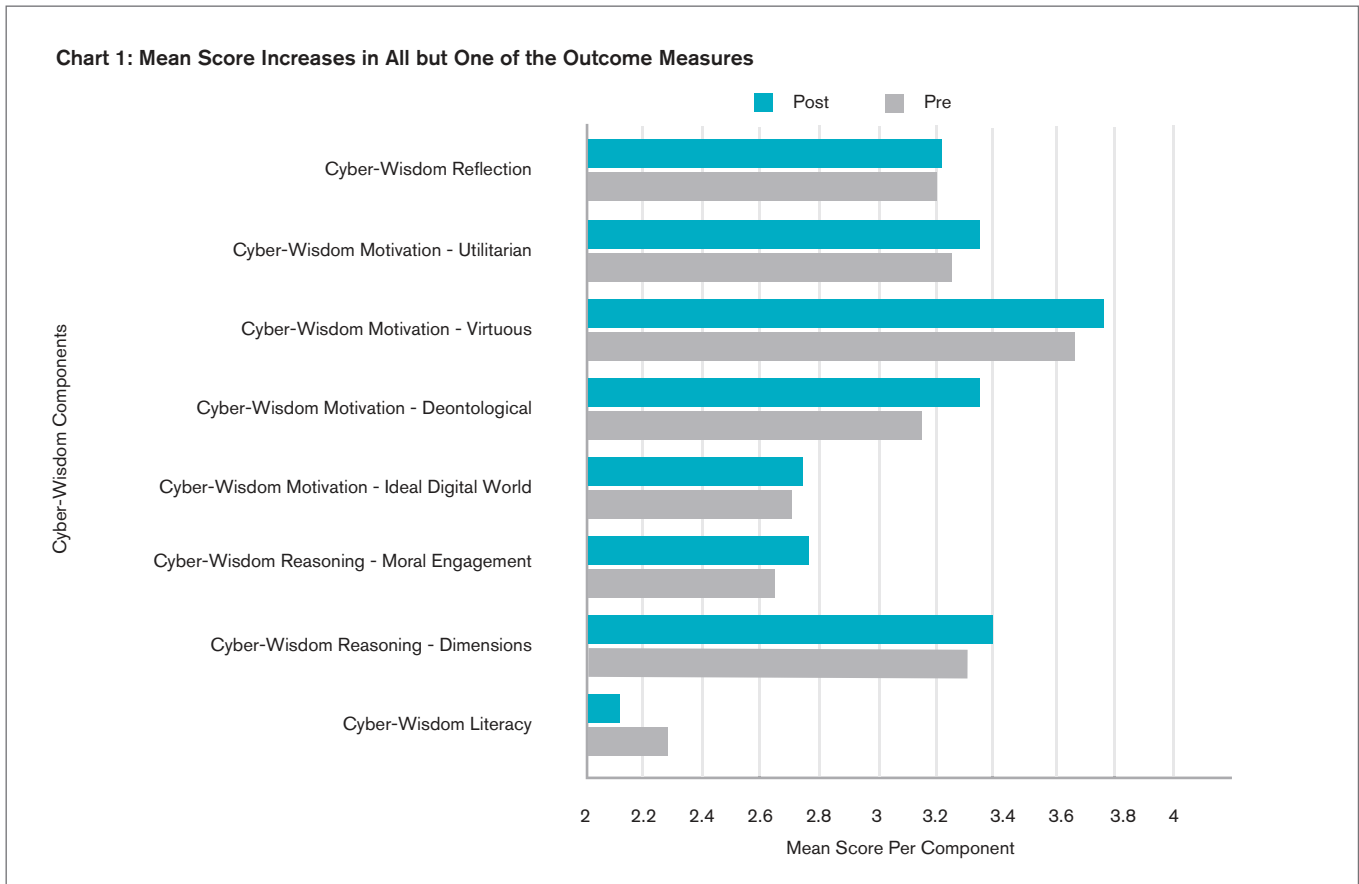
Given this was a feasibility trial, the data for each of the four schools was analysed individually. The aim was to see if the intervention appeared to have a greater influence in some schools than others. Across the schools it can be seen (Table 4) that most participants increased their scores between both points in time, although most of these were not statistically significant at the p = 0.05 level.

Table 4: Pre- and Post-Intervention Mean Scores for Each Component Across the Four Schools

	School 1		School 3		School 4		School 6	
	Pre Mean	Post Mean	Pre Mean	Post Mean	Pre Mean	Post Mean	Pre Mean	Post Mean
Cyber-Wisdom Literacy	2.29	2.41	2.14	2.14	2.25	2.01	2.26	1.99
Cyber-Wisdom Reasoning – Dimensions	3.49	3.78*	3.05	3.47*	3.18	3.09	3.15	3.24
Cyber-Wisdom Reasoning – Moral Engagement	2.77	2.90	2.52	2.83	2.40	2.45	2.67	2.73
Cyber-Wisdom Motivation – Ideal Digital World	2.75	2.83	2.71	2.73	2.57	2.67	2.54	2.60
Cyber-Wisdom Motivation – Deontological	3.35	3.59	3.01	3.38	2.97	3.08	3.02	3.33
Cyber-Wisdom Motivation – Virtuous	3.91	4.16*	3.43	3.90	3.37	3.46	3.42	3.57
Cyber-Wisdom Motivation – Utilitarian	3.36	3.55	3.11	3.44	3.11	3.27	3.17	3.21
Cyber-Wisdom Self-Reflection	3.36	3.45	3.16	3.35	2.97	3.06	3.02	3.05

Key: green depicts an increase between both points in time; red a decrease; and yellow an equal result.
* = Statistically significant difference $p < 0.05$

Looking more specifically at School 1 (Chart 2), participants who took part in the intervention showed a statistically significant increase in terms of cyber-wisdom reasoning: dimensions of wise reasoning scores (t = - 3.25, $p < 0.01$) between pre ($M = 3.39$, $SD = .67$) and post intervention ($M = 3.78$, $SD = .65$) times ($d = -.426$). This effect was also sizable among participants in School 3 (Chart 2) where the difference between pre ($M = 3.05$, $SD = .46$) and post ($M = 3.47$, $SD = .30$) intervention times was statistically significant as well ($t = -3.41$, $p < 0.01$; $d = -1.05$).
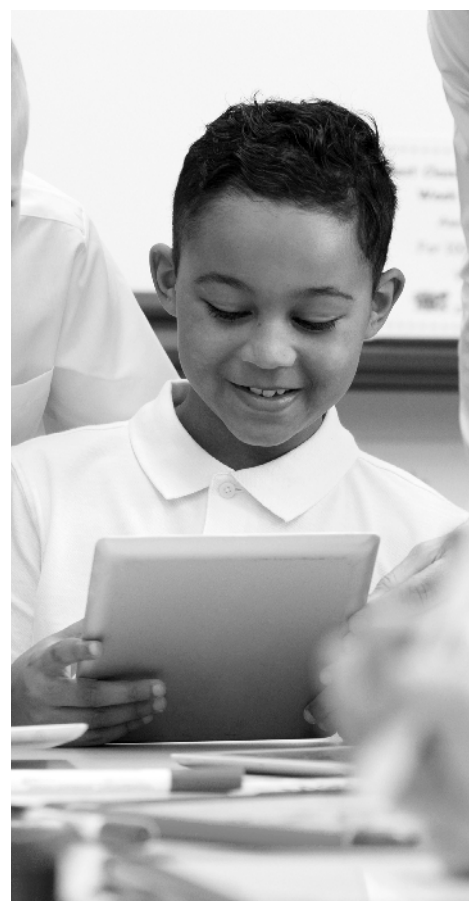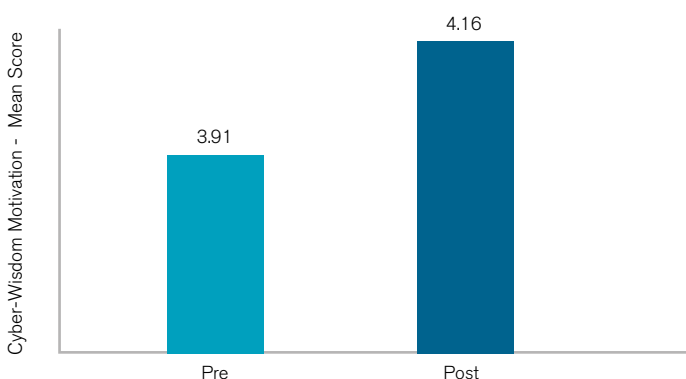
Chart 2: Cyber-Wisdom Reasoning: Dimensions of Wise Reasoning - Results for Schools 1 and 3

Cyber-Wisdom Reasoning - Mean Score

- School 1: Pre 3.49, Post 3.78
- School 3: Pre 3.05, Post 3.47

Pre ▪ Post

Chart 3: Cyber-Wisdom Motivation: Virtuous - Results for School 1

Cyber-Wisdom Motivation - Mean Score

- Pre 3.91
- Post 4.16
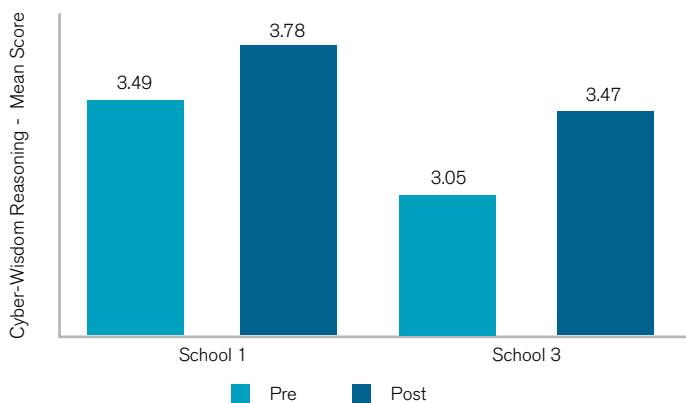
Finally, when considering pre- and post-intervention scores we can see that there was a statistically significant increase in cyber-wisdom motivation: virtuous component $(t = - 2.35, p < 0.05)$ among participants in School 1 (Chart 3) who took part in the intervention comparing pre $(M = 3.91, SD = .88)$ and post $(M = 4.16, SD = .76)$ intervention scores $(d = -.300)$.

5 Discussion, Implications, and Conclusion

The research presented in this report contributes to a growing understanding about how a form of digital character education (i.e. cyber-wisdom education) might be incorporated into existing provision. This was the first attempt to implement a taught cyber-wisdom course (to the best of the research team's knowledge) in any school worldwide. Therefore, the findings from the study, although not without limitations, provide valuable insights into how a targeted programme of learning that focuses on cultivating qualities of character required for the digital age, might be implemented. Throughout this section the implications of this study for advancing theory, research, and practice in the field are discussed.

The research fills an important theoretical gap; it contributes to an understanding of digital citizenship education that is based on the development of character virtues and wisdom, an approach that has been understudied in the literature (Polizzi and Harrison, 2020). What is lacking in the literature are studies as well as, more specifically, interventions and evaluations of interventions that promote a character approach to digital citizenship education. Such an approach is not meant to replace current approaches that may focus more on digital literacy or civic participation, but instead is designed to complement and enhance them. The study shows, probably for the first time, how a taught course focussing on cyber-wisdom, might be constructed from previous theoretical and empirical research that concentrates on the virtue of wisdom and more specifically *phronesis*. The findings show that the four-part conceptualisation of cyber-wisdom and how this may be cultivated via formal education in ways that build on previous Jubilee Centre research on the meta-virtue of *phronesis* (see Darnell *et al.,* 2019) and wisdom more broadly (see, Grossman *et al.,* 2020), provides a useful theoretical foundation for the taught courses delivered as part of the intervention. Furthermore, the findings show how Jubilee Centre research on character education, virtue literacy, and other components of virtue (Jubilee Centre, 2022) can be utilised to develop a model for cyber-wisdom education. The fact that the intervention was successfully carried out, during a period of significant Covid-related disruption, in seven schools is testament to this.

A core element of this feasibility study was an attempt to construct and undertake preliminary validation of the measures for the four-components of cyber-wisdom education, as these did not previously exist. The cyber-wisdom literacy measure was adapted from Thoma *et al.'s* (2013) adolescent intermediate concept measure (AD-ICM). The high response rate suggests the dilemma that focussed specifically on online abuse was understood by the participants. The adapted AD-ICM appears to be a useful face-valid measure of what it attempts to index. However, due to the small number of items in the adapted measure, it may not capture the full variation of cyber-wisdom literacy across participants. In the future it would be good to include additional questions that seek to also tap into the component of cyber-wisdom literacy.

The two-part cyber-wisdom reasoning measure was adapted from Brienza *et al.'s* (2018) situated wise reasoning scale (SWIS) and Thoma *et al.'s* (2013) AD-ICM. The adapted scales were considered to be adequate measures separately. In addition, a confirmatory factor analysis showed that they also had a generally acceptable two-factor model fit. This is a promising finding given the difficulty of measuring a concept wherein the 'correct' answer (i.e. what it means to reason wisely) is highly subjective. Given its properties, we would recommend that this two-question measure of cyber-wisdom reasoning could be used in future research.

The two-question cyber-wisdom motivation measure was not adapted from any existing measures. Given this, it was positive to note that after analysis it was considered a suitable fit to the theorised model and deemed to be an adequate measure (given its stage of development) of cyber-wisdom motivation. The second part of the model, which built on previous Jubilee Centre studies that assess responses against three prominent moral theories (see, for example, Arthur and Earl, 2020) did provide some interesting results, similar to findings reported in the *A Cyber-Wisdom Approach to Digital Citizenship Education* (Harrison and Polizzi, 2021) study. After experiencing the taught course, it was hoped that participants would be more likely to provide morally engaged reasons for their actions, drawing on either deontological, utilitarian, or virtue ethical reasoning. This was the case in most schools; however, the only statistically significant result for the whole cohort was for an increase in deontological reasoning. It was hoped that virtue ethical reasoning would be more pronounced after the course, and therefore, this finding is somewhat surprising and requires further investigation. The self-reporting of motivation might be considered to be problematic, and so alternative conceptualisations of motivation might be desirable in future studies. One such conceptualisation is that motivation can only be inferred from action. For example, applied behavioural scientists use functional behavioural assessments to track the consequences of behaviours and subsequently infer the motivations behind them (see Gresham *et al.,* 2001).

The fourth component, cyber-wisdom reflection, was measured through one question that was adapted from Davis's (1983) interpersonal reactivity index (IRI). This measure showed good internal consistency and excellent model fit as a single factor scale, and is worthy of consideration for use in future studies. It is worth noting that the IRI was previously used to measure moral emotion in Darnell *et al.'s* (2022) preliminary validation of the *phronesis* inventory. Therefore, the IRI may be a useful proxy measure of the degree to which character is sought.

The component measures of cyber-wisdom education generally showed promising psychometric properties, ratifying the decision to base the construction of the scales on Darnell *et al.'s* (2022) measure of *phronesis*. The measures have been preliminary validated, but may be refined in future research studies to improve their psychometric properties and to suit researchers' needs. Multiple versions of cyber-wisdom tests may be desirable depending on the aims of the studies in which they are used. For example, measures such as the AD-ICM and functional behavioural assessments can take a long time to administer and score, which presents additional challenges when they are used in larger scale randomised trials. Tests of constructs such as cyber-wisdom literacy and reasoning could be more scalable if objectively 'correct' answers were determined in advance, making the scoring process faster and more transparent. The opposite may be true of cyber-wisdom motivation though, as functional behavioural assessments, while more objective measures of motivation than self-reports, can be time consuming to administer and score. The use of experiential and other types of measures, to enhance these self-report measures, should also be considered. Finally, it would be

interesting to explore how measures might be integrated into the online apps that are popular among adolescents.

There are lessons to be learned about how the measures might be used in any future experimental trials. Despite all the schools completing the four lessons in the taught course, there were some concerns about the pre- and post-data collected. These included issues with data return from three of the schools. The fact the research was carried out at a time of unprecedented disruption during the Covid-19 pandemic added to the complexity of collecting pre- and post-intervention data. Logistical constraints surrounding data collection is a well-known issue in evaluative research studies conducted in educational settings. Steps to alleviate similar future issues would be to spend more time and effort training teachers to be 'researchers in situ'. Utilising qualitative data from pupils and teachers would allow for further possibilities to illustrate and explain the survey findings (see, for example, Arthur *et al.,* 2014).

Given the issues outlined above, it is perhaps not surprising that the results were mixed, as it would be unlikely to expect a pre- to post-intervention rise in all the components in all the schools after a relatively short intervention. Despite the embryonic state of this research, this study does however present some promising findings that suggest that cultivating components of cyber-wisdom through formal taught programmes is both feasible and desirable. This finding is particularly encouraging given that the course consisted of no more than four one-hour taught lessons, which were delivered at a single time point in the school year by non-specialist teachers. A course that has more depth, run over a longer period, and taught by specialist teachers is therefore likely to bring even more promising results.

A consideration raised by the research is about when it would be most beneficial for pupils to participate in the course. The current study was conducted with 13 to 16-year-olds but there is a case for younger pupils to experience a similar course. The fact that children increasingly start using their first smartphone whilst at primary school supports this argument. However, the decision about when to run courses on cyber-wisdom needs to be balanced against judgments about when children are most likely to start cultivating *phronesis,* with some arguing that this does not really commence until children become adolescents (see, for example, Jubilee Centre, 2022).

The findings in this study provide initial evidence that three of the components of cyber-wisdom (reasoning, motivation and reflection) can be potentially enhanced through taught courses integrated into the curriculum. In future studies, increasing the number of participants and using matched data is more likely to produce significant, valid, and more generalisable results. A more enhanced trial, at the stability phase on the evolutionary evaluation model, would be appropriate (Brown-Urban, Hargraves and Trochim, 2014). To meet the criteria for the 'stability phase' the cyber-wisdom programme would need to be implemented consistently (i.e. no changes should be made to the lesson plans or supporting materials) and also to not be dependent on key individuals to deliver it. Furthermore, there would need to be a formal written (ideally randomised) controlled trial protocol in place. The fact that the cyber-wisdom measures were deemed to generally fit the theorised model of cyber-wisdom and have good internal reliability will help to guide assessment practices in any future scaled up and/or longitudinal evaluation.

Alongside the theoretical and research implications outlined above, this study provides guidance for educators and civil society practitioners interested in digital citizenship education. Relatedly, it can be used as the basis for creating a roadmap about how to implement cyber-wisdom education in more schools in the UK and elsewhere. An outcome of this study is that a pack of lesson plans and resources have been designed, published, and made freely available[4]. It was encouraging to see that the participating schools were able to find time and space to include the course in their curriculum provision – primarily teaching it through PSHE. This can be seen as a positive endorsement of the course, given that there is little time allocated to teach digital citizenship education in schools (see Harrison *et al.,* 2022). If cyber-wisdom education is to be more widespread, it will depend on policy makers and other interested parties (such as parents and charities) advocating and creating space for character-led approaches to digital citizenship education. Finally, it is important to remember that the simple introduction of such courses into secondary schools is not in itself sufficient for the development of cyber-wisdom. The course needs to be part of a wider planned approach to digital character education in schools and society more broadly (see, for example, Arthur, Fullard and O'Leary, 2022).

Conclusion

This report presents the findings from a feasibility study into how cyber-wisdom might be understood, educated, and measured. Given the novelty of the research, the findings need to be treated with a degree of caution due to the preliminary nature of the study. Despite this cautionary note, the study presents promising evidence that a taught course can have a positive influence on the cultivation of cyber-wisdom reasoning, motivation, and reflection. Furthermore, the study found that it is possible to develop survey items that have the potential to measure the four components of cyber-wisdom education. These promising results are important given that it is widely believed that children and adolescents are not being sufficiently equipped to deal with the ethical dimensions of their digital lives (Dennis and Harrison, 2021).

A highlight of this research is that significant logistical and practical challenges of conducting research in schools during the Covid-19 pandemic were overcome. This evaluation demonstrates that it would be possible in the future to conduct meaningful assessments of the effectiveness of cyber-wisdom education interventions against pre-stated character development aims. A success of the study is shown in the newly developed measures which have been used to gain some useful, interesting, and positive results about the influence of the *Educating Cyber-Wisdom* taught course. This is particularly promising, given that the intervention consisted of no more than four lessons. On this evidence, a taught cyber-wisdom course that is longitudinal in nature, may have a great impact on the pupils that experience it. The initial study of how to measure and educate cyber-wisdom gives confidence that continued research in this field is worthy of consideration.

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[4]   See https://www.jubileecentre.ac.uk/2980/character-education/teacher-resources/cultivating-cyber-phronesis

References

Ardelt, M. (2004) 'Wisdom as Expert Knowledge System: A Critical Review of a Contemporary Operationalization of an Ancient Concept', *Human Development*, vol. 47, no. 5, pp. 257–285.

Arthur, J., Kristjánsson, K., Harrison, T., Sanderse, W., and Wright, D. (2016) *Teaching Character and Virtue in Schools*, London: Routledge.

Arthur, J. and Earl, S. (2020) *Character in the Professions: How Virtue Informs Practice Research Report*, Birmingham: University of Birmingham, Jubilee Centre for Character and Virtues, [Online], Available at: https://www.jubileecentre.ac.uk/userfiles/jubileecentre/pdf/projects/TransformativeBritain/Professions_Report.pdf [Accessed: 9 August 2022].

Arthur, J., Harrison, T., Carr, D., Kristjánsson, K. and Davison, I. (2014) *Knightly Virtues: Enhancing Virtue Literacy through Stories: Research Report*, Birmingham: University of Birmingham, Jubilee Centre for Character and Virtues, [Online], Available at: https://www.jubileecentre.ac.uk/userfiles/jubileecentre/pdf/KVPDF/KnightlyVirtuesReport.pdf [Accessed: 9 August 2022].

Arthur, J., Fullard, M., and O'Leary, C. (2022) *Teaching Character Education: What Works Research Report*, Birmingham: University of Birmingham, Jubilee Centre for Character and Virtues, [Online], Available at: https://www.jubileecentre.ac.uk/userfiles/jubileecentre/pdf/Research%20Reports/TeachingCharacterEducation_WhatWorks_ResearchReport.pdf [Accessed: 9 August 2022]

Bickham, D. S., Moukalled, S., Inyart, H. K. and Zlokower, R., (2021) 'Evaluating a Middle-School Digital Citizenship Curriculum: Quasi-Experimental Study', *JMIR Mental Health*, vol. 8, no. 9, [Online] Available at: https://doi.org/10.2196/26197 [Accessed: 29 July 2022].

Brienza, J. P., Kung F. Y. H., Santos, H. C., Bobocel, R. and Grossman, I. (2018) Situated Wise Reasoning Scale (SWIS), *APA PsycTests*, [Online], Available at: https://doi.org/10.1037/t70486-000 [Accessed: 29 July 2022].

Brown-Urban, J., Hargraves, M., and Trochim, W. (2014) 'Evolutionary Evaluation: Implications for Evaluators, Researchers, Practitioners, Funders and the Evidence-Based Program Mandate', *Evaluation and Program Planning*, vol. 45, pp. 127-139.

Burns, T. and Gottschalk, F. (2020) *Educational Research and Innovation Education in the Digital Age: Healthy and Happy Children*, Paris: OECD.

Carr, D. and Harrison, T. (2015) *Educating Character through Stories*, Exeter: Imprint Academic.

Council of Europe (2019) *Digital Citizenship Education Handbook*, [Online], Available at: https://rm.coe.int/digital-citizenship-education-handbook/168093586f [Accessed: 23 March 2022].

Darnell, C., Fowers, B. and Kristjánsson, K. (2022) 'A Multifunction Approach to Assessing Aristotelian *Phronesis* (Practical Wisdom)', *Personality and Individual Differences*, vol. 196, [Online], Available at: https://www.sciencedirect.com/science/article/abs/pii/S019188692200188X [Accessed: 14 July 2022].

Darnell, C., Gulliford, L., Kristjánsson, K., and Paris, P. (2019) '*Phronesis* and the Knowledge-Action Gap in Moral Psychology and Moral Education: A New Synthesis?', *Human Development*, vol. 62, no. 3, pp. 101-129.

Davis, M. H. (1983) 'Measuring Individual Differences in Empathy: Evidence for a Multidimensional Approach', *Journal of Personality and Social Psychology*, vol. 44, no. 1, pp. 113-126.

Dennis, M. and Harrison, T. (2021) 'Unique Ethical Challenges for the 21st Century: Online Technology and Virtue Education', *Journal of Moral Education*, vol. 50, no. 3, pp. 251-266.

Department for Education (DfE) (2019) *Teaching Online Safety in School: Guidance Supporting Schools to Teach Their Pupils How to Stay Safe Online, Within New and Existing School Subjects*, [Online], Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/811796/Teaching_online_safety_in_school.pdf [Accessed: 23 February 2021].

Global Kids Online (2021) *Quantitative Tools*, [Online], Available at: http://globalkidsonline.net/tools/survey/ [Accessed: 23 February 2021].

Grossmann, I., Weststrate, N. M., Ardelt, M., Brienza, J. P., Dong, M., Ferrari, M., Fournier, M. A., Hu, C. S., Nusbaum, H. C., and Vervaeke, J. (2020) 'The Science of Wisdom in a Polarized World: Knowns and Unknowns', *Psychological Inquiry*, vol. 31, no. 2, pp. 103–133.

Gresham, F., Watson, S., Skinner, C. (2001) 'Functional Behavioral Assessment: Principles, Procedures, and Future Directions', *School Psychology Review*, vol. 30, no. 2, pp. 156-172.

Harrison, T. (2016) 'Cultivating Cyber-*Phronesis*: A New Educational Approach to Tackle Cyberbullying', *Pastoral Care in Education: An International Journal of Personal, Social and Emotional Development*, vol. 34, no. 4, pp. 232-244.

Harrison, T. (2021) *Thrive: How to Cultivate Character So Your Children Can Flourish Online*, London: Robinson.

Harrison, T., Dineen, K., and Moller, F. (2018) *Parent-Teacher Partnerships: Barriers and Enablers to Collaborative Character Education Initial Insights*, Birmingham: University of Birmingham, Jubilee Centre for Character and Virtues, [Online], Available at: https://www.jubileecentre.ac.uk/userfiles/jubileecentre/pdf/projects/TransformativeBritain/ParentTeacher_Partnerships.pdf [Accessed: 9 August 2022]

Harrison, T., Polizzi, G., Murfin, S., and Peachey, L. (2022) *Futureproof: A Comprehensive Framework for Teaching Digital Citizenship in Schools*, Woodbridge: John Catt.

Harrison, T. and Polizzi, G. (2021) *A Cyber-Wisdom Approach to Digital Citizenship: Insights from Adolescents and Parents*, Birmingham: University of Birmingham, Jubilee Centre for Character and Virtues, [Online], Available at: https://www.jubileecentre.ac.uk/userfiles/jubileecentre/Final%20PDF%20Cyber%20Wisdom%20Report%20v2.pdf [Accessed: 9 August 2022].

Hedayati-Mehdiabadi, A., Huang, W. D., and Oh, E. G. (2020) 'Understanding Students' Ethical Reasoning and Fallacies through Asynchronous Online Discussion: Lessons for Teaching Evaluation Ethics', *Journal of Moral Education*, vol. 49, no. 4, pp. 454-475.

Humble-Thaden, M. B. (2011) 'Student Reflective Perceptions of High School Educational Cell Phone Technology Usage', *Journal of Technology Studies*, vol. 37, no. 1/2, pp. 10-16.

Jubilee Centre for Character and Virtues (2022) *The Jubilee Centre Framework for Character Education in Schools Third Edition*, Birmingham: University of Birmingham, Jubilee Centre for Character and Virtues, [Online], Available at: https://www.jubileecentre.ac.uk/framework [Accessed: 15 August 2022].

Kristjánsson, K., Fowers, B., Darnell, C., and Pollard, D. (2021) 'Phronesis (Practical Wisdom) as a Type of Contextual Integrative Thinking', Review of General Psychology, vol. 25, no. 3, pp. 239-257.

Kristjánsson, K. (2015) Aristotelian Character Education, London: Routledge.

Lee, M-.S., Zi-Pei, W., Svanström, L., and Dalal, K. (2013) 'Cyber Bullying Prevention: Intervention in Taiwan', PLOS One, vol. 8, no. 5, [Online], Available at: https://doi.org/10.1371/journal.pone.0064031 [Accessed: 29 July 2022].

Livingstone, S., Mascheroni, G., and Staksrud, E. (2018) 'European Research on Children's Internet Use: Assessing the Past and Anticipating the Future', New Media & Society, vol. 20, no. 3, pp. 1103-1122.

Magis-Weinberg, L. (2021) 'Digital Citizenship Under lockdown: Promoting the Healthy Use of Technology for Adolescents Growing-Up in Perú During COVID-19', Journal of Children and Media, vol. 15, no. 1, pp. 77-80.

Morgan, H. (2013) 'Malicious Use of Technology: What Schools, Parents, and Teachers Can Do to Prevent Cyberbullying', Childhood Education, vol. 89, no. 3, pp. 146-151.

Ofcom (2019) Children and Parents: Media Use and Attitudes Report 2018, [Online], Available at: https://ofcom.org.uk/__data/assets/pdf_file/0024/134907/children-and-parents-media-use-and-attitudes-2018.pdf [Accessed: 23 February 2022].

Polizzi, G. and Harrison, T. (2020) Integrating Cyber-Wisdom Education into the School Curriculum, Birmingham: University of Birmingham, Jubilee Centre for Character and Virtues, [Online], Available at: https://www.jubileecentre.ac.uk/userfiles/jubileecentre/pdf/insight-series/GP_TH_IntegratingCyber-WisdomEducationintotheSchoolCurriculum2.pdf [Accessed: 9 August 2022].

Ribble, M. (2007) Digital Citizenship in Schools: Nine Elements all Students Should Know, Eugene: International Society for Technology in Education.

Schwartz, B., and Sharpe, K. E. (2010) Practical Wisdom: The Right Way to Do the Right Thing, Riverhead Books.

Selwyn, N. and Aagaard, J. (2021) 'Banning Mobile Phones from Classrooms - An Opportunity to Advance Understandings of Technology Addiction, Distraction and Cyberbullying', British Journal of Educational Technology, vol. 52, no. 1, pp. 8-19.

Thoma, S., Derryberry, W. P. and Crowson, H. M. (2013) 'Describing and Testing an Intermediate Concept Measure of Adolescent Moral Thinking', European Journal of Developmental Psychology, vol. 10, no. 2, pp. 239-252.

Vallor, S. (2016) Technology and the Virtues: A Philosophical Guide to a Future Worth Wanting, New York: Oxford University Press.

Vlaanderen, A., Bevelander, K. E., and Kleemans, M. (2020) 'Empowering Digital Citizenship: An Anti-Cyberbullying Intervention to Increase Children's Intentions to Intervene on Behalf of the Victim', Computers in Human Behavior, vol. 112, [Online], Available at: https://doi.org/10.1016/j.chb.2020.106459 [Accessed: 29 July 2022].

Weber, S. J., and Cook, T. D. (1972) 'Subject Effects in Laboratory Research: An Examination of Subject Roles, Demand Characteristics, and Valid Inference', Psychological Bulletin, vol. 77, no. 4, pp. 273-295.

Zagzebski, L. (2017) Exemplarist Moral Theory, Oxford: Oxford University Press.

Appendices

Diagram 1: CFA for Cyber-Wisdom Reasoning; Moral Engagement and Dimensions of Wise Reasoning
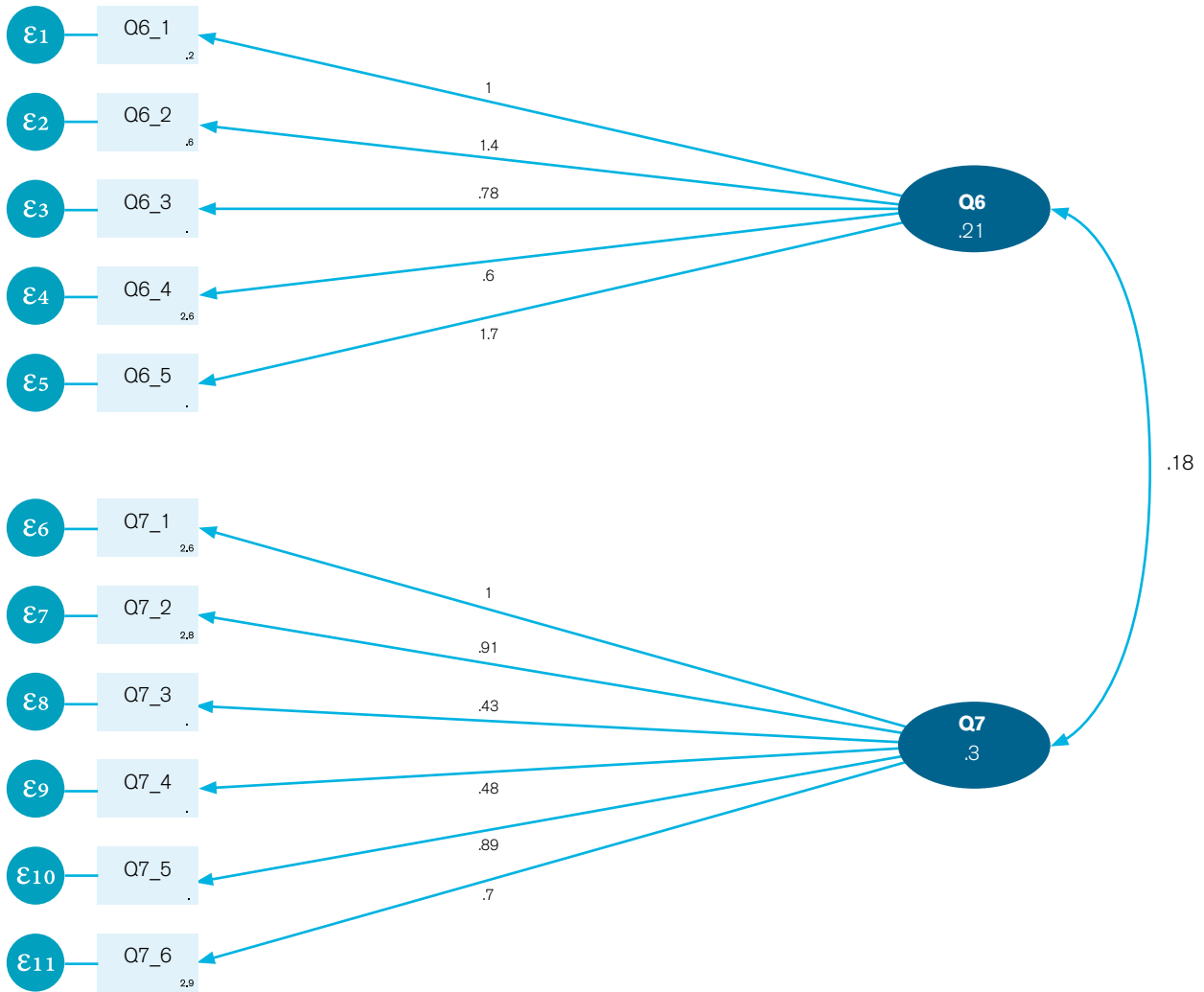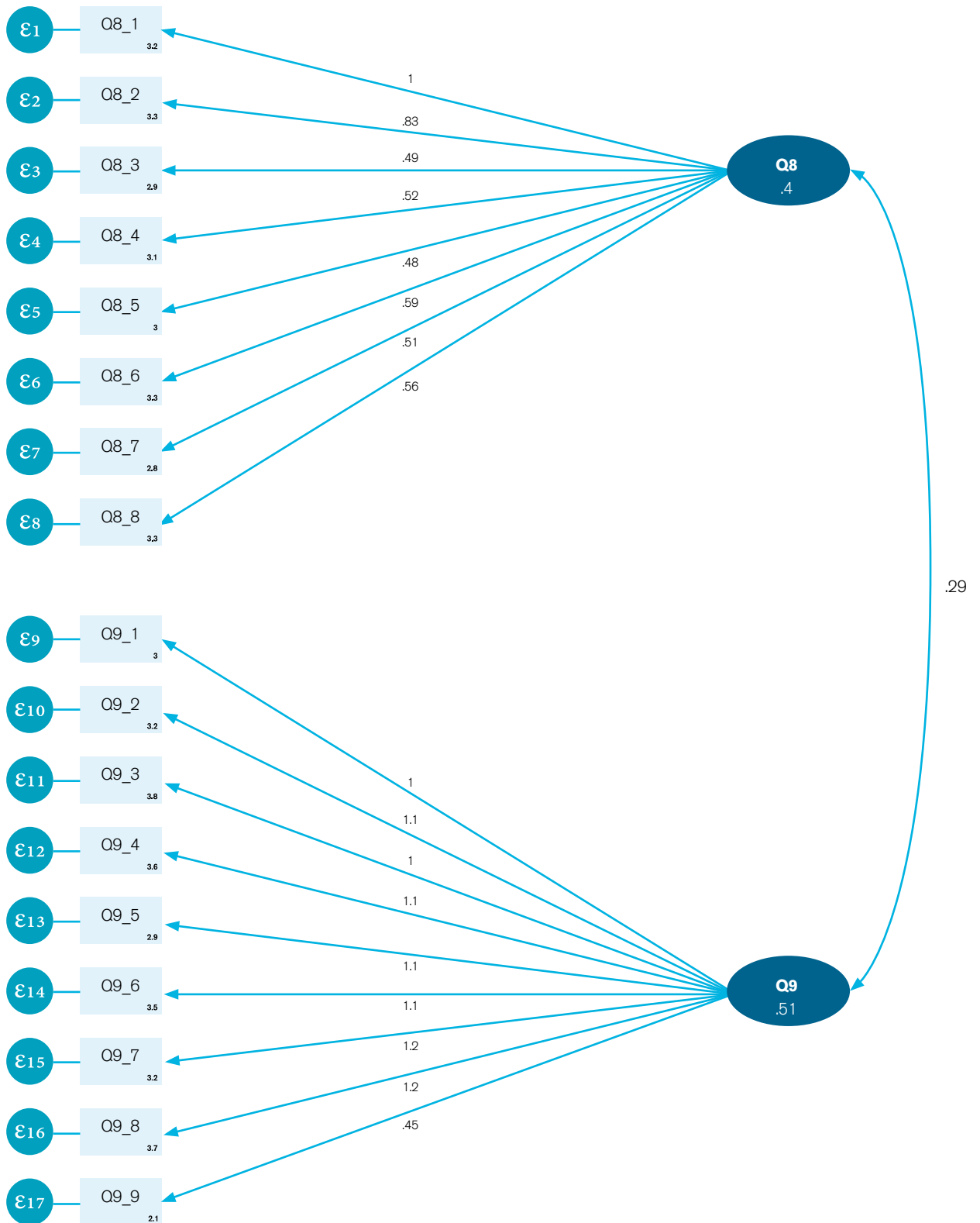
Diagram 2: CFA for Cyber-Wisdom Motivation; Ideal Digital World and Moral Theory

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Acknowledgements

JOHN TEMPLETON
FOUNDATION
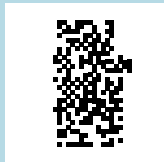
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