






ORIGINAL ARTICLE

The International Education Index: A global approach to education policy analysis, performance and sustainable development

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Abstract

Before the COVID-19 pandemic, the world struggled to address growing educational inequalities and fulfil the commitment to Sustainable Development Goal 4, which seeks to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. The pandemic has exacerbated these inequalities and changed how education functions, moving to online and hybrid methods. The challenges in global education highlighted and worsened by the pandemic make it necessary to re-evaluate education systems and the policies in place to support access, quality and equal opportunity. This article focuses on analysing education policies at a national level. It tests a pilot policy analysis tool, the International Education Index (IEI), developed as a starting point to begin this reconsideration and create an accessible and comprehensive way to evaluate national education systems to inform decision-making and policies in the new context. This research uses Ireland and Northern Ireland to test the IEI pilot tool. The IEI consists of 54 questions across nine indicators, including institutional frameworks, education strategies, digital skills and infrastructure, twenty-first century skills, access to basic social services, adherence to international standards,

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legal frameworks, data gathering and availability and international partnerships. Countries can score 108 points to be categorised as having developed, emerging or nascent national education systems. Ireland scored 94 and Northern Ireland 81, indicating that they have developed national education systems.

KEYWORDS

change and sustainability, COVID-19, education policy, policy analysis

Key insights

What is the main issue that the paper addresses?

This paper addresses how to evaluate national education systems in a post-COVID-19 world. It presents a new policy analysis tool as a pilot to engage with this question. It uses Ireland and Northern Ireland as case studies.

What are the main insights that the paper provides?

This paper provides insights into how we can and need to reevaluate national education systems post-COVID-19. Using a newly developed policy analysis tool we can see that although the case study countries (Ireland and Northern Ireland) have developed national education systems, there are still improvements needed in each context.

INTRODUCTION

Before COVID-19, the world struggled to address growing educational inequalities and fulfil commitments to Sustainable Development Goal 4 (SDG4). This goal aims to create inclusive and equitable quality education and promote lifelong learning opportunities for all people. The pandemic has setback the achievement of SDG4 and exacerbated educational inequalities. These challenges in meeting sustainable development in the education sector make it necessary to re-access education systems globally. This article offers the International Education Index (IEI) policy analysis tool to evaluate national education systems to inform decision-making and policies in the new context. This model was developed as a starting point to begin this reconsideration and create an accessible and comprehensive way to measure national policy structures and the level of preparedness of countries at policy level to support equitable education. It is a departure point to stimulate debate and collaboration on measuring national education systems and governance. Ireland and Northern Ireland are used as case studies to test the tool's validity.

The importance of SDG4 is evident in several human rights treaties, including the Universal Declaration of Human Rights (United Nations, 1948), and most nations have provisions for the right to education in their national constitutions and policies. Failing to educate people sufficiently can be regarded as a violation of the right to education because it restricts economic development and establishes cycles of low growth rates, limited opportunities for employment and fragile social cohesion (UNESCO, 2013). With a growing emphasis on education, more children have access to primary and secondary education than before the beginning of the century. However, as school completion rates grow, there is an increas-

ing focus on delivering quality education, ensuring inclusivity and preparing people for the twenty-first century. These factors are crucial as they cultivate the skills, knowledge, values and attitudes essential to securing socioeconomic needs, establishing personal well-being and enabling sustainable development (UNESCO, 2013).

The pandemic has refocused educationalists and forced innovation in continuing education by moving it online. Digital delivery highlighted significant disparities between those with access to the resources to stay connected and those without, with many students excluded, especially in impoverished communities and countries (United Nations, 2020). It is estimated that up to 95% of the world's student population was impacted by the pandemic, while over 99% of students in low- and middle-income countries had significant challenges (United Nations, 2020). The closures of schools have worsened pre-existing education disparities, reducing opportunities for the most vulnerable to continue their education, particularly for girls, persons with disabilities, those living in rural areas, refugees and forcibly displaced persons (United Nations, 2020). Based on the pandemic's economic impact, the United Nations (UN) projected that 2.8 million additional children and young people in pre-primary to tertiary education are at risk of dropping out or lacking access to education in 2021. These learning losses will probably erase years of progress in achieving SDG4, transcending beyond this generation and disproportionately affecting girls' and women's educational access and retention (United Nations, 2020).

These challenges in global education make it necessary to reconsider education systems and policies supporting access, quality and equal opportunity. Improving education depends on assessing systems' existing conditions, trends, strengths, weaknesses and root causes. An evaluation system, which considers the policy structures to support education with relevant indicators, can help progress this agenda. It will allow for comparisons in different contexts, across time and against national and international standards, and shared learning across all contexts (UNESCO, 2021). The IEI offers a framework to support this, providing a method for analysing the education policies at a national level, helping governments to understand how they can 'build back better' following the pandemic.

Measuring education systems and policies post-pandemic

The move to digital learning during the pandemic highlights the strengths and weaknesses in national education systems. A lack of digital infrastructure, skills, technologies and policies left many education systems unprepared to cope with the crisis (O'Sullivan et al., 2021). As a result, key stakeholders are now discussing the future of education and what is essential for delivering quality education. The United Nations Educational, Scientific and Cultural Organization (UNESCO, 2020), *Futures of Education after COVID-19: Regional Dialogue* report posits priority areas education systems should focus on with inclusive education to bridge educational and learning gaps. Other reports concentrate on building resilient education systems adaptive to future crises (Public Policy and Management Institute, 2021). In line with reframing education policies, the International Commission on the Futures of Education published nine ideas for public action, including commitments to strengthening education as a common good and valuing the teaching profession and teacher collaboration (UNESCO, 2020). In academia, similar themes emerge in publications such as 'Rethinking community participation in education post-Covid-19' (Iyengar, 2021) and *Higher Education's Response to the Covid-19 Pandemic: Building a more Sustainable and Democratic Future* (Harkavy et al., 2021). Central to all these reports and articles is the need to reflect on national education policies that support inclusion, equality, innovation, digitalisation and employment.

Through a systematic review of research and policy, the IEI framework comprises nine indicators that support the improvement of post-pandemic education systems and are

essential for countries to deliver high-quality education. These indicators include institutional frameworks, education strategies, twenty-first-century skills, access to basic social services, adherence to international standards on education, legal frameworks, data gathering and information availability and international partnerships. They relate specifically to how governments approach policy decisions, social and economic considerations, and the core aspects of educational needs in the twenty-first-century. By assessing countries' policies around these core indicators, the IEI offers a holistic method that produces valuable policy metrics to foster discussion and support collaboration within and between countries.

Existing education measurement systems

Some of the most notable education measurement systems include the Organisation for Economic Co-operation and Development's (OECD) *Programme for International Student Assessment* (PISA) and *OECD Indicators*. Participation in PISA is voluntary; students' test scores account for the national mean score. These scores determine if 15-year-old learners can apply what they have learned in education to real-life situations (socio-emotional skills). PISA covers science, reading, mathematics and innovative subjects, including collaborative problem-solving and financial literacy (OECD, 2017). The OECD Indicators offer data on human and financial resources invested in education, measuring the output, outcomes and impact of education systems; participation and progression within education entities; and input into education systems or the learning environment (OECD, 2020).

The IEI contributes to the measurement of education systems by focusing on policy. Current models centre on evaluating specific countries, groups or target areas. For example, PISA looks at students aged 15 and focuses on particular subjects. The IEI uses a macro-system approach to measure education through policy analysis, providing a framework to assess how education policy and political structures can support quality education. The framework evaluates institutions, policies and operational systems that broadly inform access, quality and equality in education governance, concentrating on several key factors determining educational outcomes. The IEI's approach provides a comprehensive overview of key areas where national policies can be developed, providing a basis for further assessment. It does not rank countries but instead captures what policies exist, identifying gaps and focusing on needed improvements.

METHODOLOGY

Developing the international education index

The IEI was developed by adapting an existing model for understanding complex global issues created by the Economist Intelligence Unit (EIU). Commissioned by the UN, the *Measuring Well-governed Migration: The 2016 Migration Governance Index* (MGI) (EIU, 2016) is an analytical framework that analyses contemporary migration issues. The MGI was developed using a multistep process. In the first step, a survey of secondary research was conducted on current migration policy assessment frameworks and key topical issues. Next, the EIU created a draft analytical framework to understand or 'benchmark' migration governance. This draft framework was then refined during a one-day workshop with technical experts, where five main overarching domains and key indicators for each were finalised (EIU, 2016).

Using this process and the structure of the MGI, researchers developed the IEI. The development of the analytical framework included several steps. Researchers drafted an analytical framework after conducting secondary research on national education systems and how

these systems are measured. This framework was reviewed by academic and industry experts at Maynooth University and Microsoft Ireland Education Department and modified according to feedback. The resulting framework comprises 54 questions across nine indicators explicitly related to what a quality education system should look like in the twenty-first century. The nine key indicators and definitions are listed alongside Figure 1, which illustrates each indicator and associated subcategories. The complete set of descriptors and related questions are in [Appendix](#).

1. **Institutional framework:** this asks if an institutional framework is in place which formulates and implements policies, laws, regulations and procedures. Such a framework is required to enact measures addressing education issues effectively. This indicator looks at the national institutional framework that works to design and implement education policies.
2. **Education strategy:** this indicator measures national education strategies related to inclusion, equity and quality education. It assesses if there are national policies that ensure that all people can participate in society fully.
3. **Digital skills and infrastructure:** this indicator relates to policies that ensure that technology and ICT systems are supported to enable governments, businesses and individuals to participate, inform and deliver across various economic and social areas. Access to technology and ICT creates opportunities for job creation, service delivery and improvement in living standards. This indicator focuses on policies that support a digitally enabled society.
4. **Twenty-first century skills:** twenty-first century skills prepare people for the digital future and are essential in modern job markets. These skills also help with socioeconomic mobility and are crucial to escaping poverty. This indicator assesses the policy systems which focus on three broad categories of skill development: learning skills, literacy skills and life skills
5. **Access to basic social services:** this indicator examines the policies that ensure everyone has a right to basic education. Access to education enables socioeconomic mobility upward and is a key to escaping poverty
6. **Adherence to international standards on education:** this indicator examines policies that ensure compliance with international conventions, treaties and laws that are the foundation for efficient education systems and governance.
7. **Legal framework:** this indicator measures countries' legal frameworks on education.

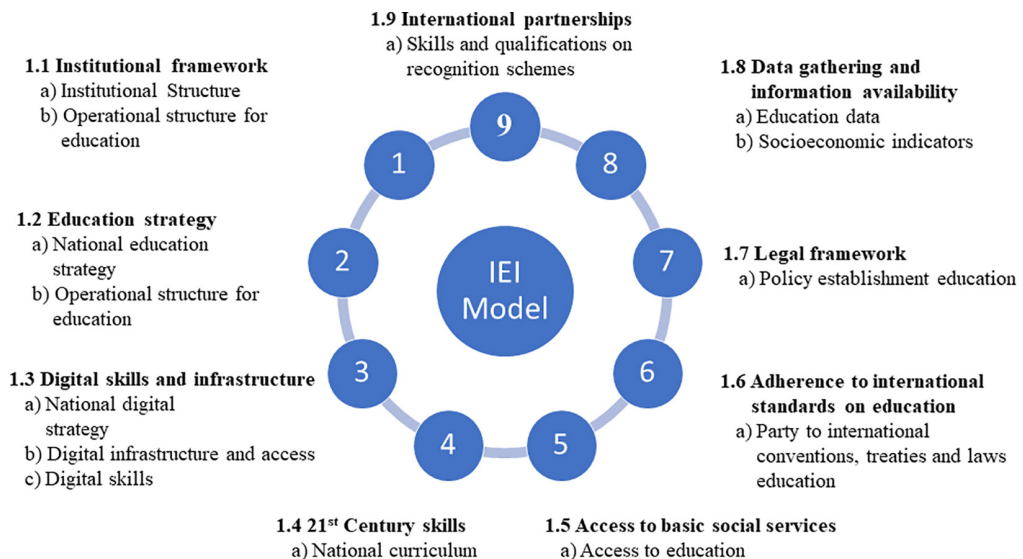


FIGURE 1 Nine indicators and associated subcategories. [Colour figure can be viewed at wileyonlinelibrary.com]

- 8. *Data gathering and information availability*: this indicator looks at the essential need to understand education trends better, ensuring well-functioning education systems. This requires reliable and transparent data on education.
- 9. *International Partnerships*: this indicator measures the transferability of education and professional degrees and equal access to education for non-national students.

Country selection and scoring model

To test the use and validity of IEI, a policy analysis of Ireland and Northern Ireland was conducted using the key indicators and the related questions. The IEI utilised a numerical value scoring system, and each question was scored on a ranking system from zero to two. Zero indicates that the question was not met, one that it was partially fulfilled, and two that it was fully satisfied. The highest score a country can receive is 108, and countries can be placed into three categories based on their score: developed (73–108), emerging (37–72) and nascent (0–36). This scoring system was developed to mirror the one used in the MGI. The number of questions under each indicator varies, which affects the total number a country can score in each category (see Table 1).

Researchers completed the IEI for Ireland and Northern Ireland mainly using primary sources, such as published government documents. When an answer was unclear, they contacted official sources such as government departments to seek clarification. After completing the IEI, researchers scored each question on a scale of zero to two, with zero for obligations not met, one for partially met and two for fully satisfied.

One team member conducted the initial IEI analyses, which the other members reviewed to mitigate potential bias in the scoring, analysis and results. They also used reflexivity throughout the research process, including when scoring the IEIs, to reduce biases influencing the analysis and results.

The following sections present the results of the IEI analysis for Ireland and Northern Ireland. Because of the extent of data collected in the IEI, it is impossible to represent it in its entirety in this article. Instead, the researchers offer information that gives a broad overview of the findings. The completed IEIs for Ireland and Northern Ireland are available in the Supplemental Materials.

Limitations of the IEI

Policy tools or techniques to evaluate and implement policies have limitations and may pose more significant challenges at the micro-level. In the case of the IEI, the nine indicators can

TABLE 1 Question and score breakdown

Indicator	Number of questions	Total score value
Institutional framework	6	12
Education strategy	11	22
Digital skills and infrastructure	8	16
Twenty-first century skills	4	8
Access to basic social services	6	12
Adherence to international standards on education	6	12
Legal framework	5	10
Data gathering and information availability	6	12
International partnerships	2	4
Total questions and possible score	54	108

be characterised differently across countries. Some questions may be relevant in specific contexts but not in others, for example, developed vs. developing nations. Second, the standard or model of what constitutes a perfect score of two may elicit specific biases from the person conducting the IEI analysis. With this, it is imperative that persons using the IEI use reflexivity. As this is the pilot policy analysis tool, more consideration and collaboration on these issues are warranted in the future.

Findings: country descriptive summaries

Table 2 and Figure 2 visually depict the scores for Ireland (94) and Northern Ireland (81) on the IEI. The scoring system shows that both countries fall within the developed category, indicating that they have national policies that support the implementation of quality education. The following section describes the country's context and how the countries performed on the indicators,

Ireland

Education context

Ireland, a member of the European Union (EU) and party to international treaties relating to education, has a developed education system, scoring 94 on the IEI. In 2018/2019, the number enrolled full-time in primary, post-primary and higher education was 1,167,999¹ (Lawlor & Burke, 2020). The categorisation of school ethos in primary and post-primary levels is Catholic, Church of Ireland, multid denominational and 'other'. In 2019, 47% of 25–64-year-olds attained third-level education. This attainment rate was higher among women (51%) than men (43%) (OECD, 2019).

Indicator summary

Institutional framework

Score 12/12

Ireland received high scores on the Institutional Framework indicator owing to several core features of the education system. The Department of Education and Skills (DES) regulates education in Ireland. DES' framework includes coordination across 11 other government departments (Department of Education (DES), 2019a) and an inter-ministerial coordination mechanism on education, the Committee on Education, Further and Higher Education,

TABLE 2 Score breakdown by category

Indicator	Republic of Ireland	Northern Ireland
Institutional framework	12/12	12/12
Education strategy	18/22	13/22
Digital skills and infrastructure	12/16	8/16
Twenty-first century skills	8/8	7/8
Access to basic social services	11/12	10/12
Adherence to international standards on education	10/12	8/12
Legal framework	10/10	10/10
Data gathering and information availability	10/12	10/12
International partnerships	3/4	3/4
Total	94	81

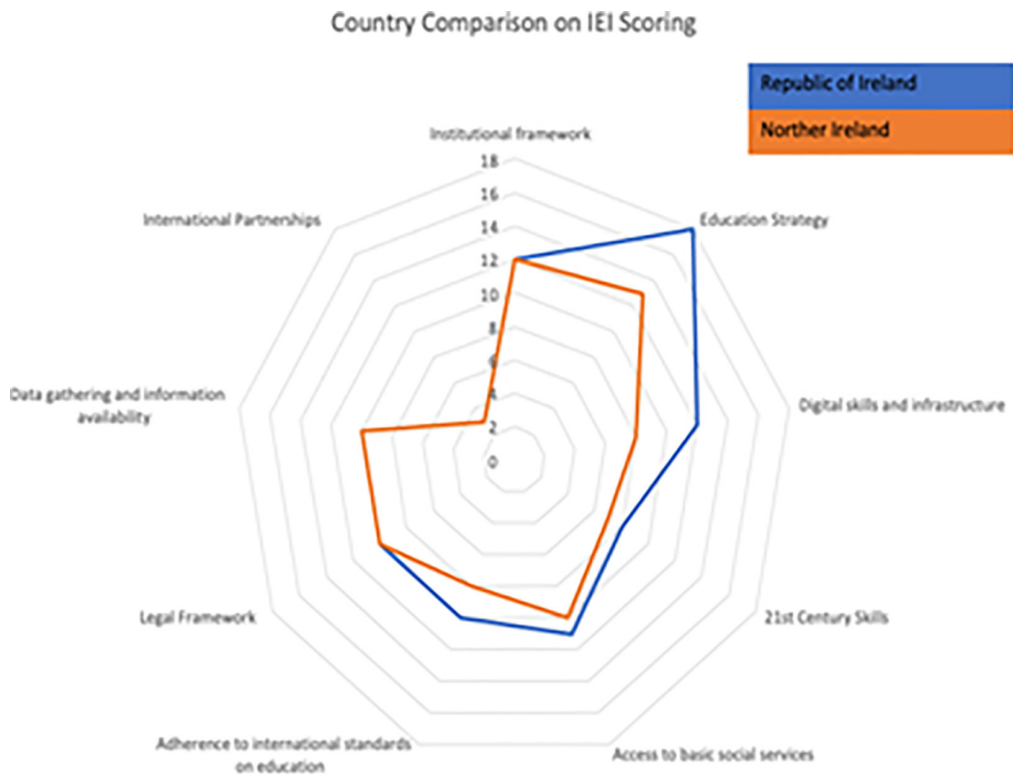


FIGURE 2 Country comparison of International Education Index (IEI) scoring. [Colour figure can be viewed at [wileyonlinelibrary.com](https://onlinelibrary.wiley.com/doi/10.1002/berj.3842)]

Research, Innovation and Science (Government of Ireland, 2021). This committee informs legislation and policy, ensuring the education system benefits society and is internationally recognised for its research, innovation and science. DES also publishes several publicly available reports annually around topics such as education strategies and evaluating education processes (Department of Education (DES), 2021a).

Education strategy

Score 18/22

The government of Ireland has several education policies and strategies, including the Action Plan for Education, which details DES' yearly goals and planned outcomes. The latest Action Plan for Education was published in 2019 (Department of Education (DES), 2019a). The government is developing the 2021 Action Plan, based on the Department of Further and Higher Education, Research, Innovation and Science, Statement of Strategy 2021–2023 (Department of Further and Higher Education, Research, Innovation and Science, 2021). This strategy has many different aspects, including overhauling the apprenticeship system, creating new legislation to reform higher education governance and advancing North–South cooperation in higher education and research (Department of Further and Higher Education, Research, Innovation and Science, 2021).

Gender equality is an important consideration. The primary education legislation briefly addresses gender, and the Action Plan grapples with gender balance in the workplace for senior academic level jobs in Higher Education (Department of Education (DES), 2019a). However, the DES Statement of Strategy 2019–2021 does not mention gender (Department of Education (DES), 2019b).

Ireland also focuses on disability inclusion in education through the National Disability Inclusion Strategy, 2017–2021. This strategy addresses assistive technologies, aiming to provide adequate technologies so those with disabilities can continue educating and working (Department of Justice, 2017). Ireland is also party to the United Nations Convention on the Rights of Persons with Disabilities, ratified on 20/03/2018 (UNTC, 2018), which also falls under the adherence to international standards on education.

Digital skills and infrastructure

Score 12/16

Recognising the increasing need to address digitalisation, Ireland has a national science, technology, engineering and mathematics (STEM) education strategy to make Ireland a leading European country in STEM by 2026 (DES, 2017). DES is responsible for digital engagement and design. For STEM education to be successful, educators need access to STEM training. Ireland has STEM training and professional development for primary, secondary and vocational education and apprenticeships; however, this is not compulsory for teachers, and there are gaps in preparation (DES, 2017).

Ireland has a National Digital Strategy focusing on digital engagement. This strategy seeks to increase citizen engagement through two main actions: skills development and awareness-raising of the benefits of being digitally literate. Also, by engaging with businesses and the private sector, the initiative aims to 'get more businesses utilizing digital' (Department of the Environment, Climate and Communications, 2013).

When exploring digital infrastructure, schools or households lack equal broadband access. Ireland's National Education and Research Network manages a centralised Schools Network for broadband. This network connects all primary and post-primary schools to the infrastructure for the internet. However, it only offers the network connection, which is utilised by companies supplying broadband (Ireland's National Education and Research Network, 2021). The government's National Broadband Plan does, however, aim to create universal connectivity in Ireland (Department of the Environment, Climate and Communications, 2021).

Twenty-first century skills

Score 8/8

Ireland is preparing a New Digital Strategy for Schools. This strategy integrates technologies into classrooms and school activities to make technologies an intricate part of the holistic education system. This initiative underscores the twenty-first-century skills of pupils and teaches skills such as 'communication and collaboration, critical thinking and analytic reasoning, research skills, creativity, problem-solving and teamwork' (Department of Education (DES), 2021a). The National Strategy for Higher Education to 2030 also focuses on twenty-first-century skills, such as 'core skills such as quantitative reasoning, critical thinking, communication skills, team-working skills and the effective use of information technology' (DES, 2011).

Access to basic social services

Score 10/12

According to the Education (Welfare) Act (2000), education in Ireland is compulsory from age 6 to 16 or until students have completed three years of secondary-level education. This Act does not mention non-nationals specifically (Government of Ireland, 2000a); however,

under the Equal Status Acts (2000), admission policy cannot discriminate on the grounds of nationality or legal status (Government of Ireland, 2000b). According to the Equal Status Acts, schools and educational institutions cannot discriminate across nine grounds: gender, marital status, family status, age, disability, sexual orientation, race, religion and membership of the Traveller community (Government of Ireland, 2000b).

Adherence to international standards on education

Score 10/12

Six primary international treaties and conventions address education. Ireland is a member party to four of the six treaties: the International Convention on Economic, Social and Cultural Rights (United Nations Treaty Collection (UNTC), 1976a), the Convention on the Elimination of All Forms of Discrimination against Women (United Nations Treaty Collection (UNTC), 1976b), the United Nations Convention on the Rights of the Child (UNTC, 1992), and the United Nations Convention on the Rights of Persons with Disabilities (UNTC, 2018). Ireland recognises the Global Convention on the Recognition of Qualifications concerning Higher Education, which the UN adopted in 2019. However, no country appears to have ratified the treaty to date (UNESCO, 2019). Ireland is not a signatory of the United Nations Convention on the Protection of the Rights of All Migrant Workers and Members of Their Families (United Nations Treaty Collection (UNTC), 1990).

Legal framework

Score 10/10

Ireland has national legislation for regulating education. A comprehensive list of enacted legislation since the state's existence is on DES' website. Some of these policies include the Education Training Boards Act (2013), the Education (Admissions to Schools) Act (2018) and the Institutes of Technology Act (2006) (Department of Education (DES), 2021b).

Ireland has legislation regulating both primary and post-primary schools. The Education Act of 1998 ensures formal provision for the education 'of every person in the State, including any person with a disability or who has other special educational needs'. The Act governs 'primary, post-primary, adult and continuing education and vocational education and training' (Government of Ireland, 1998) (DES, 2004).

Data gathering and information availability

Score 10/12

The Central Statistics Office (CSO), a statutory body, publishes regular data on education in Ireland. The education statistics focus on an overview of education, primary level education, secondary-level or further education, examination statistics, tertiary-level statistics and critical indicators (Central Statistics Office, 2021). This data can be divided by male and female, but no other genders are mentioned.

The CSO conducted the last national census in Ireland in 2011. The census form asks questions related to education, including 'what is the highest level of education/training (full-time or part-time) which you have completed to date?' and 'Have you ceased your full-time education?' (Central Statistics Office, 2011).

There is also a question about household broadband access on the census form. According to data published by the CSO, 'In 2019, 91% of households have an internet connection, increasing two percentage points since 2018. Data for 2019 indicates that fixed broadband is the most common type of internet access in the household (84% compared with 47% using

mobile broadband). Note that more than one type of internet connection may be used in households' (Central Statistics Office, 2019).

International partnerships

Score 3/4

Ireland does not allow all international students equal access to university education. Although non-EEA (European Economic Area) nationals can apply for university education, international students' fees are higher. Costs are higher for international students than Irish nationals, EU Member State nationals, EEA nationals, those from the UK, the Swiss Federation, and several other categories of persons eligible for the Free Fees Initiative. Under this initiative, eligible persons pay 3000 euros per year for higher education (Education in Ireland, 2021).

Northern Ireland

Education context

Northern Ireland, a member of the United Kingdom of Great Britain and Northern Ireland, predominantly has a developed education system, scoring 81 on the IEI. In 2020/2021, the estimated number of full-time primary school students was 173,300 and the number in post-primary schools was 148,900 (NISRA, 2020). The number of Northern Ireland domiciled students enrolled at UK higher education institutions was 63,500, and 148,000 pupils were enrolled in Northern Ireland further education colleges (NISRA, 2020).

Indicator summary

Institutional framework

Score 12/12

The Department of Education (DENI), accountable to the Northern Irish Assembly, is responsible for designing and coordinating overall education policy or a strategic plan for primary and post-primary education (Perry, 2016). The higher education division of the Department for the Economy (DfE) is tasked with formulating policy and administering funding to support research and education related to higher education (Department for the Economy (DfE), 2021a). DENI is also responsible for publishing reports on education. It produces annual reports on children and young people, curriculum and learning, good relations and social change, and statistics and research (Department of Education (DENI), 2021).

Education strategy

Score 13/22

The Education Authority's (EA) Interim Strategic Plan 2017–2027 is Northern Ireland's leading national education strategy for primary and secondary schools. It focuses on five 10 year strategic priorities, including meeting the learning needs of children and young adults, providing exceptional education support and ensuring that people have the skills to carry out their jobs successfully (Education Authority, 2017). The DfE's primary higher education strategies, Graduating to Success and Access to Success, expired in 2020, and it is unclear if new approaches are being developed (Department for the Economy (DfE), 2021c).

Northern Ireland has several laws addressing social inclusion and disability (Department for Communities (DIC), 2021a), such as the Disability Discrimination Act (2005). This Act addresses education (National Archives, 1995). Additionally, Northern Ireland is developing a New Disability Strategy to 'tackle inequalities and obstacles that affect the everyday lives of disabled people' (DIC, 2020). The current legislation does not appear to address assistive technologies. As the New Disability Strategy is still being developed, it is unclear if it will address assistive technologies.

Digital skills and infrastructure

Score 8/16

Northern Ireland has a national digital strategy, the Digital Transformation Strategy 2017–2021. However, this strategy focuses on the Public Service (Department of Finance, 2017). Although not part of the Digital Transformation Strategy 2017–2021, some government initiatives relate to digital education, such as the C2k project managed by the EA. This project 'provides the infrastructure and services to support the enhanced use of ICT in grant-aided schools across Northern Ireland' (Education Authority, 2021a). The C2k's Education Network provides various services, including WiFi, data and administration systems, online learning platforms and a dedicated Education Cloud (DENI, 2021). Northern Ireland does, however, have a national skills strategy that includes digital skills—the Skills Strategy for Northern Ireland – Skills for a 10× Economy. It has three primary objectives: 'addressing skills imbalances, creating a culture of lifelong learning, and enhancing digital skills and developing a digital spine' (Department for the Economy (DfE), 2021b).

In Northern Ireland, infrastructure for digital access is not equal across schools or households. However, all grant-aided schools access digital services through the C2k's Education Network, a government initiative (DENI, 2021). There does not appear to be assistance for higher education institutions or vocational courses. In 2019, the Northern Ireland Statistics and Research Agency (NISRA) reported on broadband access. In 2018/2019, 85% of households had broadband access, and 84% had access to home internet (NISRA, NI Profile, Key Statistics in Northern Ireland, 2020).

Twenty-first century skills

Score 7/8

The curriculum in Northern Ireland accounts for twenty-first century skills. Primary school education incorporates language and literacy, mathematics and numeracy, arts, the world around us, personal development and mutual understanding, and physical education. The secondary schools focus on a programme called Learning for Life and Work, and this programme concentrates on employability, personal development, local and global citizenship and home economics. (DENI, 2021). These curricula also include cross-curricular skills (communication, using mathematics and using ICT) and other skills (creativity, collaborating, self-management, information management and problem solving; DENI, 2021).

Access to basic social services

Score 10/12

Under the Education and Libraries (Northern Ireland) Order 1986, primary and secondary education is compulsory for all non-national and nationals living in Northern Ireland, and

pupils have equal access to primary and secondary education (National Archives, 1986). However, citizens do not have equal access to higher education. For example, tuition fees vary in publicly funded universities, depending on the learner's country of residence (Nidirect, 2021).

In Northern Ireland, people of all abilities have the same access to education. The EA has a new framework for addressing Special Educational Needs that is guided by specific legislation, including the Special Educational Needs and Disability Act (Northern Ireland) 2016 (National Archives, 2006b). The EA is also working to provide 'information and guidance for parents, carers and schools to support improved outcomes for children and young people with special educational needs' (Education Authority, 2021b). Additionally, further and higher education institutions 'have a responsibility not to discriminate against students on the grounds of sex, sexual orientation, race, religious belief and political, opinion, age, or disability' (European Commission for Northern Ireland, 2021).

Adherence to international standards on education

Score 8/12

Of the six primary international treaties and conventions addressing education, Northern Ireland is a member of the International Convention on International Covenant on Economic, Social and Cultural Rights (United Nations Treaty Collection (UNTC), 1976a), the Convention on the Elimination of All Forms of Discrimination against Women (United Nations Treaty Collection (UNTC), 1976b), the United Nations Convention on the Rights of the Child (United Nations Treaty Collection (UNTC), 1990) and the United Nations Convention on the Rights of Persons with Disabilities (UNTC, 2009). It is not a party to the United Nations Convention on the Protection of the Rights of All Migrant Workers (UNTC, 1990) and Members of Their Families or the United Nations Global Convention on the Recognition of Qualifications concerning Higher Education (OGL, 2021).

Legal framework

Score 10/10

Northern Ireland has national legislation regulating education and specific legislation for handling primary and secondary education. This legislation includes the Education Act (Northern Ireland) 2014 (National Archives, 2014), the Education (Northern Ireland) Order 2006 (National Archives, 2006a) and the Education and Libraries (Northern Ireland) Order 1986 (National Archives, 1986). There is also legislation regulating STEM education in secondary schools. Success through STEM aims to 'help to empower future generations through science, technology, engineering and mathematics to grow a dynamic, innovative economy' (DENI, 2009).

Data gathering and information availability

Score 10/12

Northern Ireland publishes data related to education regularly and DENI publishes multiple types of statistics on education, including school performance, pupil suspensions and expulsions and school leavers (DENI, 2021). A portion of this data is divided by gender. For example, the Statistical Bulletin: Year 12 and Year 14 Examination Performance at Post-Primary Schools in Northern Ireland 2015–16 provides statistics broken down by gender (DENI, 2017).

Northern Ireland collects on households with broadband access. For example, the NISRA published PfG 2016–21 Measurement Annex—Proportion of premises with access to broadband services at speeds at or above 30 Mbps, which assessed which households have broadband services at specific speeds (NISRA, 2018). The Northern Ireland Statistics and Research Agency also provides statistics on broadband and the internet in NI: IN PROFILE, Key statistics on Northern Ireland (2021). A section of this report looks at internet and broadband access by households (NISRA, 2020).

International partnerships

Score 3/4

International students do not have equal access to higher education. For example, tuition fees vary, as was discussed under the indicator *Access to basic social services*. Owing to Brexit, participation in international schemes with common qualification frameworks is still under negotiation. Professional qualification partnerships depend on free trade agreements with individual countries and Memorandums of Understanding. Northern Ireland is a member of the National Frameworks of Qualifications aligned with the European Union, which focuses on mutual recognition of further and higher education (Anonymous, 2021).

DISCUSSION

The IEI policy analysis tool pilot identifies opportunities and challenges for education policy in Ireland and Northern Ireland. Each country demonstrates developed education systems but still has areas to improve. In Ireland, there are significant policy gaps in the indicator of international partnerships. These gaps create unequal access to higher education for marginalised people and international students with higher costs and *state grants for those living in Ireland for three years*. These policies impact refugees and asylum seekers who are recognised as international students and must pay international fees until they have lived in Ireland for 3 years. The education strategies in Ireland also do not fully account for gender, which can broadly impact girls and women in education, including increasing female presence in male-dominated subjects such as STEM. Comparatively, Northern Ireland can improve in areas such as access to digital skills and infrastructure. Both are essential to full participation in society, economy and democracy in the twenty-first century. Northern Ireland must develop a digital strategy for education to ensure access to digital skills and the needed infrastructure for technologies.

Countries globally faced similar problems during the pandemic but experienced them significantly differently, with many young people unable to access education, especially in low-income countries that did not have the technologies or infrastructure to move education online. This pilot demonstrates a further need for public officials to understand national education systems and how policies must shift to meet societal change since COVID-19. This tool can help identify variables influencing decisions and actionable outcomes to improve existing systems. For example, on a top-down or institutional level, governments and universities can ensure more bespoke admission conditions for lower-income refugees and asylum seekers to access higher education and funding to attend.

Researchers and policymakers can use the IEI in different contexts beyond Ireland and Northern Ireland. As the tool is a pilot, these communities of individuals can draw on it as a foundation for specific contexts or collaborate to enhance the existing model. For instance, the study's limitations show that some questions may be more significant in certain countries than others. The more countries processed through the IEI will enable a broader dataset from which to draw and increase the model's applicability to most contexts.

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CONFLICTS OF INTEREST

The author(s) declare none.

DATA AVAILABILITY STATEMENT

The data that supports the findings of this study are available in the supplementary material of this article.

ETHICS APPROVAL STATEMENT

Not applicable.

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ENDNOTE

¹ This number does not include pre-school enrolment. Additionally, in the 2018/2019 enrolments in higher education data was unavailable for Trinity College Dublin for 2018/2019 so the 2017/2018 figures are included in the total 2018/2019 category.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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APPENDIX

Indicator	Rationale	Sub-indicators and scoring system
1.1 Institutional Framework	An institutional framework is needed to formulate and implement policies, laws, regulations and procedures. Such a framework is required to enact measures addressing education issues effectively. This indicator looks at the institutional framework that works to design and implement education policies.	<p>(a) The entities responsible for the formulation and tracking of education policy.</p> <p>Scoring:</p> <p>(a1) Is there a government agency/department responsible for designing and coordinating the implementation of an overall education policy or strategic plan?</p> <p>[Yes/no/partially (e.g. a division of another government department)]</p> <p>(a2) Is there an interministerial coordination mechanism on education issues at the national level?</p> <p>[Yes/no/partially (e.g. the interministerial coordination mechanism meets less than twice a year)]</p> <p>(a3) Is there a dedicated government agency/department responsible for publishing reports on education? (e.g. on an annual or quarterly basis?)</p> <p>[Yes/no/partially (e.g. only meets occasionally)]</p> <p>(a4) Is there a dedicated government entity or agency responsible for digital engagement or strategies?</p> <p>[Yes/no]</p> <p>(b) Operational structure for education</p> <p>(b1) Is there a dedicated government entity or agency responsible for enacting education policy?</p> <p>[Yes/no/partially (e.g. responsibilities are enacted by an entity with a different primary mandate)]</p> <p>(b2) Is there a dedicated government entity or agency responsible for enacting education policy related to migrants?</p> <p>[Yes/no/partially (e.g. responsibilities are enacted by an entity with a different primary mandate)]</p>
1.2 Education Strategy	This indicator measures national education strategies related to inclusion, equity and quality education. It assesses if there are national policies that ensure that all people can participate in society fully.	<p>(a) National Education Strategy</p> <p>(a1) Is there a national education strategy defined in a programmatic document or manifesto?</p> <p>[Yes/no/partially (e.g. the strategy addresses one level of education but not another)]</p> <p>(a2) Is the strategy gender-responsive? (Please consider LGBTQIA2S+)</p> <p>[Yes/no/partially (e.g. the strategy does not promote gender equality and the empowerment of women or LGBTQIA2S+)]</p> <p>(a3) Does the national strategy address adult learning?</p> <p>[Yes/no]</p> <p>(a4) Does the national education strategy address equal access to information and communication technologies (ICTs)?</p> <p>[Yes/no/partially (e.g. the strategy only addresses some aspect of equal access)]</p> <p>(a5) Does the national strategy address science, technology, engineering, and mathematics (STEM) education?</p> <p>[Yes/no]</p> <p>(a6) Does the national education strategy address ICTs alongside primary, secondary and post-secondary education?</p> <p>[Yes/no/partially (e.g. the strategy address one level of education but not others)]</p> <p>(a7) Does the country have a national disability inclusion strategy?</p> <p>[Yes/no/partially (e.g. if there is a strategy but it does not address education)]</p> <p>(a8) Does the strategy address access to assistive technologies?</p> <p>[Yes/no/partially (e.g. if there is a strategy but it does not address education)]</p> <p>(a9) Does the country provide funding for ICTs to primary, secondary, post-secondary education, vocational training programmes and apprenticeships?</p> <p>[Yes/no/partially (e.g. the strategy address one level of education but not others)]</p> <p>(a10) Does the strategy address the language needs of national and non-nationals in education? (e.g. those learning in a second language)</p> <p>[Yes/no]</p> <p>(a11) Does the strategy inclusive of different groups? (e.g. Indigenous, Traveller communities, etc.)</p> <p>[Yes/no/partially (e.g. the strategy is inclusive of some but not others)]</p>

(Continues)

APPENDIX (Continued)

Indicator	Rationale	Sub-indicators and scoring system
1.3 Digital skills and infrastructure	This indicator relates to policies that ensure that technology and ICT systems are supported to enable governments, businesses and individuals to participate, inform and deliver across various economic and social areas. Access to technology and ICT creates opportunities for job creation, service delivery and improvements in living standards. This indicator focuses on policies that support a digitally enabled society.	<p>(a) National digital strategy</p> <p>(a1) Does the country have a national digital strategy? [Yes/no/partially (e.g. the strategy does not focus on education or the national strategy is different across regions because of factors, such as religion, division etc.)]</p> <p>(a2) Is the strategy connected to national economic strategies? [Yes/no]</p> <p>(a3) Does this strategy include measures for increasing citizen engagement? [Yes/no]</p> <p>(a4) Does this strategy engage with the private sector? [Yes/no]</p> <p>(a5) Does the country have a national digital skills framework or strategy? [Yes/no/partially (e.g. if the country has a digital framework or strategy but it has not been implemented)]</p> <p>(b) Digital infrastructure and access</p> <p>(b1) Do all primary, secondary, post-secondary and vocational courses have equal access to broadband? [Yes/no/partially (e.g. the strategy addresses one level of education but not others)]</p> <p>(b2) Do all households have access to broadband? [Yes/no]</p> <p>(c) Digital skills</p> <p>(c1) Does the country provide free training and professional development for primary, secondary, vocational and apprenticeship teachers related to STEM? [Yes/no/partially (e.g. the strategy addresses one level of education but not others)]</p>
1.4 Twenty-first century skills	<p>Twenty-first century skills prepare people for the digital future and are essential in modern job markets.</p> <p>These skills also help with socioeconomic mobility and are key to escaping poverty.</p> <p>Twenty-first century skills focus on three categories: learning skills, literacy skills and life skills</p>	<p>(a) National curriculum</p> <p>(a1) Does the national curriculum focus on teaching students twenty-first century skills? [Yes/no/partially (e.g. the national curriculum focuses on one skill set but not the others)]</p> <p>(b) Labour demand and supply</p> <p>(b1) Is there a national assessment for monitoring labour market demand for critical skills (e.g. shortage occupation lists for STEM-related jobs)? [Yes/no]</p> <p>(b2) Does the country have strategies/policies to fill critical skills gaps for STEM-related jobs? [Yes/no]</p> <p>(b3) Do all citizens and non-nationals have equal access to basic and continuing education focused on improving twenty-first century skills? [Yes/no/partially (e.g. they have equal access to programmes focuses only on some twenty-first-century skills)]</p>

APPENDIX (Continued)

Indicator	Rationale	Sub-indicators and scoring system
1.5 Access to basic social services	This indicator examines the policies that ensure everyone has a right to basic education. Access to education enables socioeconomic mobility upward and is a key to escaping poverty.	(a) Access to education (a1) Do all citizens have access to government-funded education, apprenticeships and vocational training? [Yes/no/partially (e.g. if citizens can access some types of education but not others). Please include key details if there are barriers or limitations to accessing education (e.g. differences in fees)]. (a2) Do all migrants have the same status as citizens in accessing government-funded education and vocational training? [Yes, regardless of migration status/yes, depending on migration status/no access to any level of education] (a3) Do people of all abilities have the same access to education? [Yes regardless of gender/no depending on gender status/partially, with restrictions imposed for particular abilities (e.g. disabilities)] (a4) Do all genders have the same access to education? (e.g. please consider LGBTQIA2S+) [Yes regardless of gender/no depending on gender status/partially, with restrictions imposed for particular genders] (a5) Do all ethnic groups have the same access to education? [Yes regardless of ethnic groups/no depending on the ethnic group/partially, with restrictions imposed for particular ethnic groups] (a6) Do all socioeconomic groups have the same access to education? [Yes regardless of socioeconomic groups/no depending on socioeconomic groups/partially, with restrictions imposed for particular socioeconomic groups]
1.6 Adherence to international standards on education	This indicator examines policies that ensure compliance with international conventions, treaties and laws that are the foundation for efficient education systems and governance.	(a) Party to international conventions, treaties and laws (a1) Is the country a signatory of the International Convention on International Covenant on Economic, Social and Cultural Rights? [Yes/no] (a2) Is the country a signatory of the United Nations Global Convention on the Recognition of Qualifications concerning Higher Education? [Yes/no] (a3) Is the country a signatory of the Convention on the Elimination of All Forms of Discrimination against Women? [Yes/no] (a4) Is the country a signatory of the United Nations Convention on the Rights of the Child? [Yes/no] (a5) Is the country a signatory of the United Nations Convention on the Rights of Persons with Disabilities? [Yes/no]
1.7 Legal framework	This indicator measures countries' legal frameworks on education.	(a) Policy establishment education (a1) Is there national legislation regulating education? [Yes/no] (a2) Is there national legislation regulating primary education or the country's equivalent? [Yes/no] (a3) Is there national legislation regulating secondary education or the country's equivalent? [Yes/no] (a4) Is there national legislation regulating STEM education in primary education or the country's equivalent? [Yes/no] (a5) Is there national legislation regulating STEM education in secondary education or the country's equivalent? [Yes/no]

(Continues)

APPENDIX (Continued)

Indicator	Rationale	Sub-indicators and scoring system
1.8 Data gathering and information availability	This indicator looks at the essential need to understand education trends better, ensuring well-functioning education systems. This requires reliable and transparent data on education.	(a) Data gathering and information availability (a1) Does the country collect and publish data related to education on a regular basis (e.g. on a quarterly or annual basis) (Outside the census) [Yes/no/partially, e.g. data is published, but is very limited, not regularly updated] (a2) Does the country collect and publish education data disaggregated by gender? [Yes/no/partially, e.g. data is published, but is very limited, not regularly updated] (a3) Are there questions on education in the national census? [Yes/no] (b) Socio-economic indicators (b1) Does the country collect data on households with access to broadband? [Yes/no] (b2) Does the country collect data on primary schools and secondary schools with access to broadband, smartphones, tablets, computers? [Yes/no] (b3) Does the country collect data on households by zone (urban and rural)? [Yes/no]
1.9 International partnerships	This indicator measures the transferability of education and professional degrees and equal access to education for non-national students.	(a) Skills and qualifications on recognition schemes (a1) Does the country participate in international schemes with common qualification frameworks (e.g. the European Qualifications Framework)? [Yes/no] (b) International students (b1) Does the country allow equal access to university education for all international students (e.g. fees, access to specific courses, etc.)? [Yes (score yes even if a visa is required)/no/partially (e.g. fees for international students are higher than for students who are citizens of the country)]