

REPORT SERIES: EDUCATION & COVID-19

What sources of data did teachers use to inform remote teaching under Covid- 19?

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Summary

The Covid-19 pandemic disrupted education systems worldwide, forcing teachers to find new ways to teach students when physical attendance at school was not possible. Our study investigated how teachers gathered and used data to understand and cater for the diverse educational needs of students in remote learning. We surveyed teachers to understand the challenges faced by emergency remote teaching (ERT) and how they gathered and used existing data to meet their students' needs. While some teachers had experienced online learning as students, few had taught remotely or online. This meant that teachers had limited experience on which to draw when adjusting to ERT. This was reflected in the limited change to data collection during remote teaching. Our research demonstrates a need to develop teachers' pedagogical practice and use of data to manage differentiated learning and a flexible response to the given environment in which they are teaching.

1. Introduction

The Covid-19 pandemic has affected education systems and schools in varying ways locally, nationally and internationally. The effects have varied according to the severity of the pandemic in a given location, and to government, system and local responses. Lockdown meant a sudden switch to emergency remote teaching (ERT). ERT emerged as a type of online experience, defined as a rapid transition from face-to-face or blended instruction to fully online learning in which teaching staff and students engage remotely, often from their homes (Hodges et al., 2020).

An aspect of ERT that we explored was how teachers, working in such uncertain, rapidly changing conditions, catered for diverse student needs in whichever online or mixed-mode they adopted. Our study began with the premise that data underpins sound decisions about adjusting pedagogy and content to meet students' needs. So, we gathered information from teachers about the data they used to make decisions about their practice during ERT.

2. Literature review

2.1 UNDERSTANDING DIFFERENT MODELS OF LEARNING

ERT differs from classroom-based and online methods. This presents challenges. In recent decades, in many countries, education has shifted from teacher-centred to student-centred approaches (Harris et al., 2013). School education generally takes place within a classroom. Use of technology in classrooms is commonplace, supporting these innovative and collaborative learning opportunities (Groff, 2013).

Online learning implies a fully online course which is either self-directed or instructor-led (Warschauer, 2020). Definitions of online learning tend to come from the higher education sector where it is well-established. Courses are prepared and designed for asynchronous learning (Means et al., 2014). Online courses are delivered through a purpose-built, secure learning environment which allows for synchronous and asynchronous learning. Student engagement and outcomes arise from a combination of teaching skills in online pedagogy; learners' motivation, skills with, attitude towards and access to technology; and contextual factors (Rapanta et al., 2020).

While online learning has become a catch-all term for any learning that involves technology, there are important differences between online and remote learning (Warschauer, 2020). Online learning is characterised as planned and specially designed courses, while emergency remote teaching is rapidly assembled and attempts to replicate face-to-face experiences or traditional learning environments (Hodges et al., 2020; Warschauer, 2020). This was demonstrated during the coronavirus pandemic, which necessitated sudden and significant changes to educational practices (Hodges, et al., 2020). Teachers were forced into the unfamiliar environment of ERT (Chase & Taylor-Guy, 2020), using a range of online learning platforms (Department of Education and Training, 2020) and/ or sending worksheets home to students. This is in contrast to Warschauer's (2020) assumption that remote teaching is fully mediated by technology.

2.2 THE DIGITAL DIVIDE

In the shift to ERT, many teachers needed to consider their students' access to technology. Access to technology and to reliable internet connection varies for those living in 'regional, rural and remote' locations (Halsey, 2018). Socioeconomic and cultural inequalities also contribute to a digital divide in relation to access and skills (World Bank Group, 2020; The Educator, 2020). Melodie Potts Rosevar, CEO of Teach for Australia, described the digital divide as 'including lack of access to devices, lack of internet service, and challenges with digital competency' (The Educator, 2020). Outside school, places such as libraries and community centres that gave students access to technology were also closed or not available to students who were self-isolating. The shift to remote learning therefore had the potential to negatively affect the education of a large proportion of students, particularly those whose learning was already at risk, perpetuating issues of inequity (Brown et al., 2020; Rapid Research Information Forum, 2020).

However, access to technology is not the only issue. Some students who had previously thrived in traditional school environments encountered significant challenges with ERT (New York Times, 2020). Others who found traditional learning environments challenging thrived under ERT (Parker, 2020; Siossian, 2020). This raises issues about how teachers ascertained and accommodated the different learning needs of students within an ERT environment.

2.3 EVIDENCE-LED LEARNING & TEACHING

A teacher's role includes identifying where a student is in their learning and using this to inform teaching. There is a well-established variability in student proficiency levels (Harlen, 1997; Masters & Forster, 1997; Wiliam, 2007). In the everyday classroom, teachers use a range of data (observations, assessment, individual education plans and so on) to inform their planning. This is the same for ERT.

3. Research design

3.1 CENTRAL RESEARCH QUESTIONS

Our study aimed to investigate teachers' use of data during periods of ERT by asking how they gathered and used data to understand and cater for the diverse learning and teaching needs of students in forced emergency remote teaching environments during the Covid-19 pandemic.

The study also asked the following questions.

- 1. To what extent did teachers collect data or use existing data about student learning needs to inform teaching and learning within the remote learning environment?
- **2.** How was data used to differentiate learning and teaching for different student needs?
- **3.** To what extent did teachers find data helpful in informing their teaching approach?

3.2 METHODOLOGY

We used a mixed methods approach (Bazeley, 2012) which allowed us to collect and analyse qualitative and quantitative data. A survey was the most feasible way to collect data from a wide range of teachers across a dispersed geographical area in the least amount of time.

3.3 SURVEY DESIGN

The survey included questions about demographics including respondents' teaching discipline, years of teaching experience, school context, age, prior experience with online and remote learning, and previous professional learning in assessment, using data and differentiation. We also asked respondents about the remote learning modes they adopted and the data they used to determine student learning needs within ERT. We used a 'branching design' so that survey participants did not see questions that were irrelevant to them. The survey has been published as a separate annex to this report (Chase et al., 2021).

The Australian Council for Education Research (ACER) ethics panel approved the study. We obtained respondent consent and provided a plain-language explanation on the survey landing page. We complied with ACER's institutional practices for secure storage of survey data.

3.4 SAMPLING

We recruited participants using a snowball approach. We sent invitations to alumni and students of ACER, and publicised the survey through professional networks, social media and an in-house publication (ACER News, 2020). We were interested in the responses of teachers from the early years and school sectors. We encouraged invitees to share the survey with colleagues. The online survey was open between October 2020 and February 2021. It yielded 161 responses of which 117 contained usable data.

3.5 PROCEDURES FOR DATA ANALYSIS

We removed the responses of respondents who did not give consent, or who completed the survey insufficiently, or who did not work in the early years and school sectors.

We analysed the demographic and quantitative data with standard descriptive statistics. We analysed the responses to open-ended questions thematically according to the interactive model (Miles et al., 2014). The data condensation stream involved data cleaning and coding using colour and layout in Microsoft Excel. When writing our final report, we frequently returned to the data displays to verify that summaries accurately represented the themes evident in the data.

4. Results

We asked respondents some demographic questions, including which country they lived in (see table 4.1) and about their school.

Table 4.1Country of respondent

Country	No. respondents
Australia	81
United States of America	6
Philippines	5
India	4
Ghana, Malaysia, Romania, Turkey, UK	2 each (10 total)
Algeria, Andorra, Antigua & Barbuda, Bahrain, Bangladesh, Brazil, Canada, China, Japan, Madagascar, Pakistan, Uganda	1 each (12 total)

Note. N=118

Responses to the pandemic were different across regions of Australia. Table 4.2 shows the number of Australian respondents by state. Victoria (where the majority of Australian respondents worked) experienced the longest periods of school closures, thus the longest period of ERT.

Table 4.2Australian responses by state

Australian states	No. respondents
Australian Capital Territory	2
New South Wales	8
Northern Territory	3
Queensland	3
South Australia	3
Tasmania	4
Victoria	49
Western Australia	9

The majority of respondents worked in secondary schools (see table 4.3). They taught across a range of subjects.

Table 4.3 Teaching area of respondents

Teaching area	No. respondents
Secondary school	61
Primary school	42
Early childhood	7
Primary & secondary	3
Special school	1
Other	1
Unspecified	2
Total	117

Of the 117 usable responses, a majority of respondents worked in an urban area (n=93). Around one-third taught in low socioeconomic status (low-SES) contexts (n=40). A majority of respondents were aged over 35 (n=93) with the mode in the '45 to 54' category (n=41). Fifty-seven respondents each had more than 16 years' teaching experience. Sixty respondents were in a leadership position: 35 department heads or equivalent, and 14 principals or vice-principals.

4.1 PRIOR EXPERIENCE OF ONLINE LEARNING & TEACHING

Some respondents had been exposed to online and remote learning as students. Twenty-three respondents had studied in synchronous environments, while 39 had studied in asynchronous environments. Fourteen had taught using synchronous online methods, while 26 had taught using asynchronous methods. This means that most respondents had limited or no experience of developing online and remote pedagogies before the pandemic. Yet, nearly all respondents implemented some form of remote or online teaching, with 77 respondents conducting synchronous online sessions and 82 respondents making learning materials available online.

4.2 USE OF STUDENT DATA TO PREPARE FOR ERT DURING THE PANDEMIC

We asked respondents about the strategies they used to prepare for their students' needs. Thirty-four respondents

referred to, or implied that they used, differentiation strategies, such as varying their expectations of different students, providing a range of activities to cater for differing levels of ability, or producing a variety of content (such as videos) for different ability levels. Respondents had also done this before ERT.

We identified two other themes that may also relate to differentiation: one-to-one approaches and small group approaches. Sixteen respondents contacted individual students to support them with remote learning. Twelve respondents used small groups to differentiate by ability level, or to encourage students to collaborate. These strategies are not unique to remote teaching, which may imply that some teachers used the same strategies in remote learning as they would in the classroom. However, some strategies, while effective in the classroom, may not translate directly to remote teaching (Hodges et al., 2020).

Some respondents (n=14) used audio-visual content including 'slides accompanied by narrated worked solutions' and 'recorded videos to watch later to complement text and images in online platform'. Like the approaches to differentiation, these technology-based strategies are not unique to remote teaching. As one respondent reflected: 'I teach via a blended learning model in class. I didn't have to change my teaching strategies'.

Table 4.4Sources of data used by teachers to make decisions about strategies to cater for student needs prior to ERT by frequency of response

Source of data	Frequency of response
Past school performance data from standardised tests	58
Past school performance from teacher- created assessments	60
Personal observations & knowledge of the student	82
Personal contact with carers of the student	44
Surveys of students	34
Surveys of parents	10
Total number of respondents	89*

^{*}Note: Respondents could make multiple selections.

We asked respondents to identify the different sources of data they used before the pandemic to cater for student needs. Respondents (N=89) used three main sources: observation (n=82), teacher-created assessments (n=60) and standardised test results (n=58). They also identified other sources of information such as progress checks on student portfolios.

4.3 COLLECTING & USING DATA FOR REMOTE LEARNING

We asked respondents to identify the sources of data used during periods of ERT to monitor student engagement and progress. The 88 respondents who completed this question (see table 4.5) indicated that conversations with students (n=69), teacher-created assessments (n=69) and personal observations of students (n=62) were the dominant sources of data. Twenty-one respondents used standardised test data during ERT compared with 77 respondents before the pandemic.

Table 4.5Sources of data used by teachers to monitor student engagement and progress in learning during ERT by frequency of response

Source of data	Frequency of response
Standardised tests	21
Teacher-created assessments	69
Personal observations of the students	62
Personal contact/conversations with carers of the student	48
Conversations with students	69
Surveys of students	36
Surveys of parents	9
Total number of respondents	88*

^{*}Note: Respondents could make multiple selections.

During emergency remote teaching, respondents gathered some data as they had previously, including surveys of students and parents/carers, and contact with parents/carers. This may imply that some aspects of teachers' data collection and decision-making strategies persisted despite the change in teaching mode.

Differentiation emerged as a significant theme in the open-ended responses. We asked respondents how they used data to inform their teaching during remote

and online learning. Twenty-seven respondents used the data for differentiation. This included adapting content and assessments and, as one respondent wrote, 'personalis[ing] learning for students with specific needs'.

Twenty respondents referred to using data to modify content or strategies. For example, several respondents modified the timing of lessons 'to better suit the pace of work in remote learning', to 'change how much content in timeframe (sometimes too much, sometimes not enough)' and to 'set... less work and generally giv[e]... them more time'. This indicates that respondents used the data they collected to evaluate whether their expectations of their students were reasonable and achievable according to students' learning and broader needs within the ERT environment.

5. Discussion

Because the survey sample self-selected, the findings are not generalisable to the wider population of teachers. However, they may point towards possible trends that warrant further investigation. While some survey respondents had experienced online learning as students, few had experience of teaching in remote or online environments. This meant that they were adapting to a new mode of instruction while attempting to maintain continuity for their students. Despite the challenges faced, many respondents used a range of data to inform educational decisions.

5.1 TO WHAT EXTENT DID RESPONDENTS COLLECT DATA OR USE EXISTING DATA ABOUT STUDENT LEARNING NEEDS TO INFORM TEACHING & LEARNING WITHIN THE REMOTE LEARNING ENVIRONMENT?

Respondents had limited experience on which to draw to adjust their practice to ERT. This was reflected in the limited changes to data collection during periods of remote teaching. Use of data from standardised tests declined. However, respondents did not think that this affected their plans for students. Respondents used the same data as they did before the pandemic. They did not tend to develop further assessments to monitor student progress during periods of ERT.

5.2 HOW DID RESPONDENTS USE DATA TO DIFFERENTIATE LEARNING & TEACHING FOR DIFFERENT STUDENT NEEDS?

There was little evidence of any change. Respondents generally used the same strategies as before to support their students, including varying their expectations of students, providing a range of activities to cater for level of ability and/or producing different versions of content for different ability levels. Respondents surveyed parents/carers and students about welfare and engagement, not necessarily to assess student progress.

5.3 TO WHAT EXTENT DID RESPONDENTS FIND DATA HELPFUL FOR INFORMING THEIR TEACHING APPROACH?

Despite the fact that nearly all respondents (n=110) were forced to adopt some form of remote or online teaching because of school closures, there was little evidence of them changing their practice. There was no evidence of systemic change. Respondents spent more time and effort on preparing lessons and supporting students than before ERT, but they used the same teaching strategies as they had in face-to-face teaching. This raises questions about how teachers might utilise data to inform strategies that are more conducive to the online teaching and learning environment.

6. Recommendations

Teachers' pedagogical practice and use of data needs to be developed in order to inform differentiated learning and flexible modes of delivery. Professional development for teachers, offered at a system level, could develop skills in and understanding of curriculum development and online pedagogies. A starting point would be understanding the similarities and differences between online, remote and face-to-face pedagogies, and the respective opportunities that these afford. Increased understanding of how to differentiate in different environments, and more awareness of the digital divide and its challenges, could lead to more flexible and sustainable modes of delivery.

7. Conclusion

Despite limited experience of ERT or online learning, the teachers who took part in our survey expended time and effort to ensure continuity of learning for their students. They used the technology of remote teaching to provide a substitute for in-person contact. They did not tend to modify learning designs or outcomes, nor did they tend to collect data during ERT that could have assisted with differentiation within the ERT environment.

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