Chapter 3

OER use in the Global South: A baseline survey of higher education instructors

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Summary

The research presented here provides baseline data regarding the use of Open Educational Resources (OER) by higher education instructors in the Global South (South America, Sub-Saharan Africa, and South and Southeast Asia). It does so while attending to how such activity (or inactivity) is differentiated across continental regions and associated countries. The chapter addresses two questions: what proportion of instructors in the Global South have used OER, and which variables may account for different OER usage rates between respondents? This is done by examining which variables – such as gender, age, technological access and digital proficiency – seem to influence OER use rates, thereby allowing the authors to gauge which are the most important for instructors in their respective contexts.

This study is based on a quantitative research survey taken by 295 randomly selected instructors at 28 higher education institutions in nine countries (Brazil, Chile, Colombia; Ghana, Kenya, South Africa; India, Indonesia, Malaysia). The 30-question survey addressed the following themes: personal demographics, infrastructure access, institutional environment, instructor attitudes and open licensing. Survey responses were correlated for analysis with respondents' answers to the key question of the survey: whether they had ever used OER or not.

Findings indicate that 51% of respondents have used OER, a rate slightly differentiated by region: 49% in South America, 46% in Sub-Saharan Africa and 56% in South and Southeast Asia. A number of variables were associated with varying levels of OER use rates – such as instructors' country of habitation (and its gross domestic product per capita), level of digital proficiency, educational qualification, institutional position and attitude to education – while many others were not, such as instructors' gender, age or perception of their institutions' OER-related policies. ▶

For these respondents in the Global South, OER use is predicated upon instructors enjoying a certain minimum level of access to information and communication technologies infrastructure – especially hardware (computers, mobile devices, etc.) and internet connectivity (broadband, Wi-Fi, etc.) – which, once achieved, can be described as an enabling factor for OER engagement, but not a motivating factor. Beyond that minimum, increased internet speeds, lower internet costs and greater diversity of technical devices do not seem to lead to ever-increasing OER use rates. Similarly, while OER-related policies would likely be a crucial factor in OER creation, they did not seem to be important regarding OER use. Lastly, it was instructors in the comparatively less-developed countries who were using OER at a markedly higher rate than those from the more developed countries (at least intra-regionally). This suggests that instructors from the relatively lesser-developed countries may find greater utility in OER because it serves to overcome some of the pressing educational challenges associated with their nations' contexts' lower economic development.

The dataset arising from this study can be accessed at:
https://www.datafirst.uct.ac.za/dataportal/index.php/catalog/609

Acronyms and abbreviations

CC	Creative Commons
COL	Commonwealth of Learning
GC	global coordinator
GDP	gross domestic product
GNU GPL	GNU General Public Licence
HEI	higher education institution
ICT	information and communication technologies
LC	local coordinator
MOOCs	Massive Open Online Courses
OER	Open Educational Resources
RC	regional coordinator
ROER4D	Research on Open Educational Resources for Development
USD	United States dollars
VBA	Visual Basic for Applications (Excel programming function)

Introduction

Despite the many useful studies on the use of Open Educational Resources (OER) in higher education, most are focused on the activity of instructors located in the Global North who enjoy comparatively higher levels of economic development, educational provision, policy elaboration, and technological access than those in the Global South (Allen & Seaman, 2014; CERI/OECD, 2007; Clements & Pawlowski, 2012; Pegler, 2012; Reed, 2012; Rolfe,

2012). This means that less is known about educators' OER-related practices in the region where OER is touted as having its potentially greatest impact (Butcher, 2011; COL, 2016; Kanwar, Kodhandaraman & Umar, 2010). This is an imbalance which recent studies have started to address (Dhanarajan & Porter, 2013; Kanwar et al., 2010) and which this study seeks to make a contribution in mitigating.

Within this context, one of the most challenging questions that has emerged in the literature concerns how the deployment of OER – as a largely digital innovation – may in fact reinforce global, regional and national economic and social inequalities through a "digital divide" (Friemel, 2016; Kruger & Gilroy, 2013; Lopez, Gonzalez-Barrera & Patten, 2013; Velaga, Beecroft, Nelson, Corsar & Edwards, 2012) that benefits those with educational and technological access and skills, while bypassing those without (Lane, 2009). This goes against the ethic driving the Open Education movement, which in large part aspires to get more educational resources into the hands of those who have not been able to access educational content through traditional channels. Many OER advocates hope that such materials will provide greater educational accessibility and reduce social division (Hassani, 2006) because of the cost advantages associated with "free" materials. However, as Lane (2009) cautions, these "free" resources rely on a rather expensive foundation of infrastructural, technological and intellectual capacities that many do not enjoy, especially in the Global South, by which we mean "developing countries, which are located primarily in the Southern Hemisphere" (UNDP, 2012, p.1), especially in Latin America, Africa and Asia.

While it is possible to broadly distinguish between a relatively wealthier and more developed "Global North" and a comparatively poorer and less developed "Global South", we remain mindful of the fact – as revealed in the cumulative evidence of the Northern-based OER studies – that the Global North is, within itself, highly differentiated, with pockets that resemble the stereotype of the Global South – i.e. characterised by relatively low economic development, political instability and uneven technological accessibility. This recognition prompts us to also pay attention to differentiation within the Southern context under investigation, seeking to understand it in all of its nuance and idiosyncrasy. Thus, while it is useful to marshal the Global South as an analytical construct – since we tend to know less about the OER activities here than elsewhere – it is also crucial to embrace the diversity and contradictions it contains.

This study focuses on higher education instructors in the Global South, concentrating on those located in South America, Sub-Saharan Africa, and South and Southeast Asia. Based on a survey of 295 instructors at 28 higher education institutions (HEIs) in nine countries (Brazil, Chile, Colombia; Ghana, Kenya, South Africa; India, Indonesia, Malaysia), this research seeks to establish a baseline set of data for assessing OER use in these regions while attending to how such activity is differentiated across continental areas and associated countries. This is done by examining which variables – such as gender, age, technological access, digital literacy, etc. – seem to influence OER use rates, thereby allowing us to gauge which are the most important for instructors in their respective contexts.

The two research questions that drive this study are:
1. What proportion of instructors in the Global South have ever used OER?
2. Which variables may account for different OER usage rates between respondents in the Global South?

The study's survey compares respondents' OER use against a variety of demographic, contextual and pedagogical variables in order to understand which factors seem to have the greatest influence on whether instructors in the Global South have used OER. This is the first study of its kind to focus solely on OER use amongst higher education practitioners across the Global South, though it draws inspiration from surveys that have been conducted in the Global North (CERI/OECD, 2007; Masterman & Wild, 2011; OER Hub, 2014; ORIOLE, 2013) as well as portions of the Global South (OERAsia, 2010; UNESCO/COL, 2012). Ultimately, we hope that this will assist educational researchers, advocates and policy-makers to better understand the current OER landscape, while at the same time inspiring further studies to yield additional insights on this issue.

Literature review

In order to address the research questions posed by this study, the growing body of OER literature was consulted so as to grasp which factors or variables were key to determining OER activity by instructors in the Global South. This informed the choice of survey questions that were asked of respondents, allowing us to see whether the variables identified in the literature were relevant for understanding OER use in the Global South context.

Demographics

The first set of variables noted in a number of studies was demographic in nature. Respondents' geographical context, primarily their region or country, was considered a potential factor in some studies (Kanwar et al., 2010). Gender was listed by others as a potential differentiator for educational praxis (Takeda & Homberg, 2013). Such personal, identity-related characteristics were also seen as extending to age (Friemel, 2016), as well as to instructors' first language (Conole, 2012) and the educational language context in which they worked (Amiel, 2013; Clements & Pawlowski, 2012).

Extending these demographic considerations to instructors' experiential characteristics, studies also suggest that OER use could be influenced by level of digital proficiency (ECDL, 2011), level of academic qualification (Lane, 2009), disciplinary area (Coughlan & Perryman, 2011) and employment position (Oyelaran-Oyeyinka & Adeya, 2004a).

Infrastructure

The second set of variables centred on respondents' infrastructural context, one of the most commonly assumed differentiating factors between people in the Global North and South. Numerous studies discuss the potential impact of technological accessibility (to hardware, internet, etc.) on OER engagement (Dhanarajan & Porter, 2013; Teixeira et al., 2012).

Investigations into technological accessibility are nuanced by other studies dealing with internet affordability (Watson, Clouser & Domizi, 2013), availability (Lane, 2009), cost (Herrera, 2010), speed (Hassani, 2006), stability (Oyelaran-Oyeyinka & Adeya, 2004b), quality (Hassani, 2006), place of access (Jackson et al., 2006) and types of devices used to access the internet (Ericsson, 2014).

Institutional environment

A third set of variables focused on the institutional environment in which instructors work – particularly the OER-related policies, strategies and structures that are, or are not, in place. A number of studies look at the relationship between OER use and whether an institution has an OER repository (McGreal, 2012), OER-related training or support for instructors (Nonyongo, 2013), OER-related support for learners (Simpson, 2013), OER policies (Harley & Lawrence, 2007), an OER-related promotion or rewards system for instructors (Allen & Seaman, 2012), and an intellectual property policy that is favourable for the adoption of OER by instructors (Rhoten & Powell, 2007).

Instructor attitudes

A fourth set of variables identified in the literature relates to the personal attitudes of instructors towards openness and OER (van der Merwe, 2015), which includes their level of awareness around the concept (Mtebe & Raisamo, 2014), their intention to use OER (Lee, Yoon & Lee, 2009) and their perception on OER's ease of use and pedagogical utility (Lee et al., 2009). These studies address the question of personal volition and agency in the decision to use (or not use) OER.

Pedagogical practices

Lastly, the literature consulted focused on variables centring on OER use and creation practices, which are valuable for examining OER-specific practices as well as those pertaining to other types of (fully copyright-protected) educational resources. Studies covered such practices as OER reuse (Clements & Pawlowski, 2012; Pegler, 2012), creation (McGreal, Kinuthia & Marshall, 2013), revision (McGreal et al., 2013), remixing (Amiel, 2013; McGreal et al., 2013), redistribution (Lansu, Cillessen & Bukowski, 2013; McGreal et al., 2013) and curation (Mihailidis & Cohen, 2013).

These five thematic areas shaped the decisions made about key areas of focus to be investigated in the survey questionnaire, discussed in further detail in the Methodology section.

Methodology

This study employed a quantitative research approach in which a survey acted as the principal means of data collection. This section discusses the many facets comprising the survey effort and some of the challenges faced in terms of site selection, operations, instrument design, random sampling (including validation), survey administration and data analysis.

Site selection

The target respondents for the survey were instructors at HEIs from the three major regions that are referred to collectively as comprising the Global South: South America, Sub-Saharan Africa, and South and Southeast Asia. Within each region, selection efforts focused on three countries, identified through a convenience sampling method based on areas where other studies in the Research on Open Educational Resources for Development (ROER4D) project were being undertaken, and where collaborators who could help administer the survey were most easily found. The following countries, grouped by region, were chosen: Brazil, Chile and Colombia; Ghana, Kenya and South Africa; India, Indonesia and Malaysia.

Within these countries, the collaborators – called local coordinators (LCs) – were recruited based on their access to HEIs that were potential research sites. Often, they were members of staff at those institutions, or scholars who were able to petition and gain permission from an institution to conduct surveys there. This selection process took many months to finalise due to the fact that it was not always easy to identify collaborators who were free to work during the specified time period, or because the chosen institutions had privacy policies precluding outsiders from conducting research among their staff. Additionally, even within institutions that allowed such external research, there were often extensive ethics clearance processes that took many months to complete, making the initial institutional selection process quite time consuming.

In each of the nine countries, four HEIs were identified and targeted for participation in the study. With the help of the LCs, institutions were selected that, collectively, would possess most of the characteristics making up the national higher education landscape, based on variables such as rural/urban, large/small, residential/distance, public/private, and so forth. This was done so that the survey would adequately represent the diverse and complex national education systems under study. In most cases, this was achieved at a satisfactory level.

The initial proposal for the study called for the participation of 36 HEIs across the nine countries, but we were unable to gather data at eight of those HEIs due to data restrictions enforced by the institutions that were approached. (This was also the case at alternative institutions which were selected as second choices.) Ultimately, because of time constraints, the selection and solicitation process could not go on indefinitely, which resulted in a sample of 28 institutions, as listed in Table 1.

As can be seen from Table 1, the project's greatest challenge in terms of institutional participation was in South America, where institutions were hesitant to participate in a survey led by non-institutional, external researchers which might expose their instructors' practices to scrutiny. Given that the subject of the study was OER, a field that deals with intellectual property (i.e. legal) issues, some institutions feared that the survey might reveal practices that could negatively impact their reputations. Though the final version of the survey did not focus extensively on that element of educational practice, meaning that it is doubtful the questionnaire would have unduly exposed an institution to embarrassing revelations, we respected the concerns of the different institutions.

Table 1: **HEIs participating in the study**

Region	Country	Institution
South America	Brazil	Claretiano – Centro Universitário, Batatais
		Universidade de São Paulo
	Chile	Universidad de Chile
		Universidad Santo Tomás
		Universidad de Tarapacá
	Colombia	Universidad Nacional de Colombia
Sub-Saharan Africa	Kenya	Great Lakes University
		Jomo Kenyatta University of Agriculture and Technology
		Maseno University
		Tangaza University College
	Ghana	Catholic Institute of Business and Technology
		Kwame Nkrumah University of Science and Technology
		University of Cape Coast
		University of Ghana
	South Africa	University of Cape Town
		University of Fort Hare
		University of Pretoria
		University of South Africa
South and Southeast Asia	India	Gauhati University
		University of Delhi
	Indonesia	Universitas Mercu Buana
		Universitas Nasional
		Universitas Pancasila
		Universitas Terbuka
	Malaysia	Disted College
		Kolej Damansara Utama
		University of Malaya
		Wawasan Open University

Operations

The key members involved in this research project were the global coordinator (GC), the regional coordinators (RCs), the LCs, a project mentor, a statistician, a research assistant and a journalist. Project team members were also assisted more broadly by the ROER4D Network Hub team.

The lead researcher of the project (José Dutra de Oliveira Neto) acted as the GC for all survey-related activities, overseeing the activities of the RCs from Sub-Saharan Africa (Judith Pete) and South and Southeast Asia (Daryono), and acting as the RC for South America himself. A member of the ROER4D Network Hub (Tess Cartmill) also came on board in the final writing and analysis phase to assist with data preparation and analysis.

The RCs were tasked with appointing and supporting the LCs, who collected data from the various institutions. The GC was further supported by a project mentor who provided assistance and advice regarding OER research; a statistician to help with the particular issues involved in quantitative statistical methods and analysis; a research assistant to assist with both operational and analytical matters; and a journalist to keep project stakeholders aware of the process and the findings via social media.

The LCs took responsibility for collecting data from respondents in the HEIs surveyed. They helped gather the information necessary for allowing the GC and the statistician to randomly select which instructors would be targeted for surveying. The GC typically emailed the survey invitations to respondents via SurveyMonkey. However, in contexts where respondents lacked easy access to computers or the internet, the LCs printed out and administered the survey manually, then uploaded the responses into SurveyMonkey themselves. They delivered survey completion incentives (such as USB flash drives, free lunches on campus, etc.) to respondents who stated that they were interested in being considered for the incentives (which were typically determined through a random "draw" process after completion of the surveys). Incentives for respondents were provided to promote increased participation and boost the quality of responses (Hogan & LaForce, 2008; Tambor et al., 1993). After collecting all the responses, the LCs wrote brief reports about their institutional contexts and their data collection experiences in order to assist the RCs in the data analysis process.

Instrument design

In order to reduce the threats to validity in the instrument design, a strategy was adopted based on previous studies by Burton and Mazerolle (2011) and Messick (1989) to define the constructs, develop and assess the questions, and pilot the survey. This yielded a survey instrument that had 24–28 questions (depending on the skip pattern and how respondents answered certain questions) and took 15–20 minutes to complete.

Step 1: Define the constructs

In order to define the primary constructs of the study, a comprehensive review of the OER literature was conducted and a series of focus group discussions with OER experts was initiated. The construct definitions were centred on the factors influencing the adoption of OER, in line with the primary focus of the research questions.

A comprehensive review of the OER literature was conducted using bibliometric analysis to identify variables within the literature that addressed issues affecting OER adoption. To do this, data were collected from the Web of Science Collection and a tool called Histicite was used for conducting historical reviews while allowing for data-mining and citation analysis from the sample of papers generated (Garfield, Pudovkin & Istomin, 2003). The search terms used were "OER", "Open Education Resources" and "education resources".

Additionally, several focus group discussions occurred with members of the ROER4D researcher network to discuss variables for inclusion in the survey. This was done in conjunction with a broader ROER4D survey question harmonisation experiment (Trotter, 2015), facilitated by the project Network Hub. Through this process, 71 variables – most of which are mentioned in the Literature Review – were identified that were seen as potentially

shaping OER adoption activity amongst higher education instructors. Based on these variables, questions for a draft pilot survey were formulated.

Step 2: Develop and assess the questions

To increase the validity of the survey – and to reduce the number of variables involved so as to focus only on the most relevant ones – "investigator triangulation" was used. This is a process more commonly used by qualitative researchers to check and establish validity in studies by incorporating several viewpoints (Yeasmin, 2012).

Invitations were sent to 34 researchers in the ROER4D researcher network (of which 76% had six or more years of research and educational experience) to assess the draft instrument's content and validity. This was followed by a questionnaire comprising 62 questions – each associated with a particular variable and rated according to a Likert scale from 1 (extremely low) to 7 (extremely high) – administered with the SurveyMonkey tool. Respondents had to answer questions based largely on the following formulation: "To what extent does [variable X] have an effect on the adoption of OER?" In the questionnaire, OER "adoption" was defined as OER "use and/or adaptation".

Based on the responses of these OER specialists, the survey was streamlined to a set of 30 questions, some of which utilised skip logic, meaning that if respondents answered certain questions in certain ways, they would either continue with further questions or skip to the next section. There were four different language versions of the questionnaire: English, Bahasa Indonesia, Portuguese and Spanish. All translation was done by a native translator from the main English version.

Step 3: Pilot the survey

The pilot survey was delivered to a sample of 63 English-speaking students and instructors, 10 Bahasa Indonesia-speaking instructors, eight Portuguese-speaking students and instructors, and three Spanish-speaking students and instructors from the education institutions in our sample. This cognitive test was done so as to identify potential problems with the survey (Postlethwaite, 2005) and to understand respondents' experience in completing it (Creswell, 2012).

A number of challenging issues surfaced from the pilot. First, many respondents did not understand the meaning of the term "Open Educational Resources". Most had never used any form of open licence for sharing their own educational materials, nor had they been exposed to the concept. The final survey therefore needed to include explicit definitions of the concept throughout.

Second, because the level of awareness of the OER concept was low for pilot respondents (meaning that they were perhaps exposed to the concept for the first time during the survey), it was clear that it would be difficult to compare the study's findings to other surveys, at least as regards actual OER practices. In many cases, for respondents who were encountering the concept for the first time, their responses to certain questions were hypothetical rather than based on actual experience. Thus, a number of questions in the survey were revised and the term "Open Educational Resources" was replaced with the broader "educational resources" so that it would be possible to establish some baseline data on respondents' practices with the usual educational materials they dealt with. In other words, the survey approach shifted to look more at general practices than at just open practices, in case

there was a relationship between the two. (Within this context "educational resources" included OER.) The responses to these general questions about educational materials were later correlated with question 26 that asked about OER use and open licensing.

Third, to test the new version of the questionnaire, a second pilot test (in English and Spanish) was conducted with 34 instructors from the sample of HEIs to be surveyed based on a convenience sampling method. Minor revisions were made after this second pilot phase and the 30-item questionnaire was finalised.

Random sampling

To identify the most representative group of respondents possible at each research site, a random sampling method was used to eliminate potential selection biases by giving all individuals an equal chance to participate.[1] The process required a series of steps to be completed at each institution, which generally proceeded in the following fashion:

1. The LC obtains a list of all courses being taught at the institution during the appropriate semester.
2. The GC and the statistician randomly select 30 courses from those lists at each institution using the Excel VBA function, order them in a hierarchical sequence, then share the results with the LCs.
3. The LCs approach the instructors of the courses, starting with the first course on the list and proceeding in numerical order to: (1) ascertain whether that course has more than 30 students enrolled and, if so, (2) ask the instructor whether they would then be willing to participate in the survey, along with some of their students. Randomly selected courses that did not have 30 students were de-selected and the LC went to the next one on the list. This process continued until 10 instructors of courses with 30 or more students agreed to participate in the survey. (As noted, we carried out a similar survey with students at these same institutions, assessing their level of OER awareness and use. For the purposes of this chapter, however, we focus on the instructors' survey. We anticipate publishing the results of the student survey in the future.)

Survey administration

With the email addresses of the selected instructors provided by the LC, the GC initiated the survey process by sending them emails with links to the online SurveyMonkey-generated surveys. In many cases, the GC had to send follow-up invitations to remind respondents to complete the survey.

Because each HEI had a target sample of 10 instructors, the process described continued until these numbers were reached (relying on the ordered lists generated through the random sampling process). As can be seen in Table 2, this process entailed a certain level of variation from the description above, with some LCs obtaining more than the necessary respondents, and others less. This speaks to the unique circumstances that each LC faced at their respective institutions. However, despite the unevenness of the response

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1   https://www.ma.utexas.edu/users/mks/statmistakes/RandomSampleImportance.html

rates at the different institutions, we believe that we obtained a truly random – and therefore representative – sample of instructors as survey respondents.

In total, questionnaires were distributed to 390 instructors, of whom 379 consented to complete the survey and 11 declined to give consent. Of those who consented, 346 began to answer the initial questions, with numbers gradually declining to 295 respondents who answered the key question (number 26 in the survey) concerning whether they had ever used OER. For the purposes of the analysis in the Findings section, the 295 respondents are those of most interest as their data can be correlated to their responses regarding OER use.

Table 2: Survey response numbers by country (fully completed)

Region	Country	Number of institutions	Number of instructors
South America	Brazil	2	17
	Chile	3	33
	Colombia	1	9
Regional total		**6**	**59**
Sub-Saharan Africa	Ghana	4	38
	Kenya	4	43
	South Africa	4	34
Regional total		**12**	**115**
South and Southeast Asia	India	2	23
	Indonesia	4	44
	Malaysia	4	54
Regional total		**10**	**121**
Total		**28**	**295**

Data analysis

The survey comprised 30 questions: 24 for respondents who had never used OER before, an additional four questions for those who had used OER, and two opening questions that were not of analytical relevance, dealing with the respondents' consent to take the survey and the name of their institution.

For the purposes of this chapter, the thousands of potential data points that the survey yielded are reduced to only those that will help us answer the two key research questions. To answer these, the majority of the questions have not only been analysed in and of themselves but, more importantly, have been correlated with the responses given to the key question of the survey: whether a respondent has used OER or not. Thus, the following variables are compared with OER use responses to understand whether they affect OER engagement:

Demographics
- Country
- Region
- Gender
- Age
- Level of digital proficiency
- Highest educational qualification
- Teaching areas
- Position at HEI

Infrastructure
- Location/s of internet access
- Device/s used to access internet
- Internet cost, speed and stability

Institutional environment
- Institutional policy/perspective on OER

Instructor attitudes
- Perspective on which educational materials are "free" to use
- Willingness to use OER again

Open licensing
- Use of licences on educational materials in teaching approach (copyright, Creative Commons [CC], etc.)

By combining and graphing these variables with respondents' answers to whether they had ever used OER, we generated the necessary data to attempt to answer our key research questions, as discussed in the Findings section.

Data sharing

The instructor data from the administered survey (n = 295) and the accompanying English-language questionnaire were published on the DataFirst Data Portal after undergoing a multiphased quality assurance and de-identification process. The authors and the ROER4D Curation and Dissemination team checked data files for consistency and correctness, whereafter a de-identification process was undertaken utilising an omission and abstraction strategy.

The resulting dataset, published under a Creative Commons Attribution (CC BY) licence, comprised the instructor survey questionnaire in PDF; the instructor survey microdata shared in CSV, STATA, SAS and SPSS formats; and accompanying metadata.

Findings

This section presents the findings of this multi-country OER survey, focusing first on the instructors' demographic variables, followed by those related to infrastructure, institutional environment, instructor attitudes and pedagogical practices. Before assessing OER use according to these factors, it is useful to start by revealing the baseline OER use established by the survey, which answers our first research question: What proportion of instructors in the Global South have ever used OER? These percentages will need to be kept in mind as we discuss the influence that the different factors have on OER use. Thus, Table 3 reveals instructors' responses to the question: Have you ever used OER that are available in the public domain or that have an open (e.g. CC) licence that allows it to be used and/or adapted by others? (This was asked after instructors had been given a definition of OER.)

Table 3: Instructors' use of OER

Region	Country	Yes (%)	Not sure (%)	No (%)
South America	Brazil (n = 17)	71	24	6
	Chile (n = 33)	45	36	18
	Colombia (n = 9)	22	56	22
Regional total	**n = 59**	**49**	**36**	**15**
Sub-Saharan Africa	Ghana (n = 38)	53	32	16
	Kenya (n = 43)	49	30	21
	South Africa (n = 34)	35	32	32
Regional total	**n = 115**	**46**	**31**	**23**
South and Southeast Asia	India (n = 23)	70	22	9
	Indonesia (n = 44)	70	7	23
	Malaysia (n = 54)	39	15	46
Regional total	**n = 121**	**56**	**13**	**31**
Totals	**n = 295**	**51**	**25**	**24**

Note: Some rows do not add up to 100% due to rounding.

Table 3 reveals that, in total, just over half (51%) of all instructors surveyed in the Global South have used OER (at least once). Roughly one-quarter have never used OER, and a quarter were not sure whether or not they had used OER.

These numbers are difficult to assess because they are not directly comparable to similar studies. For instance, if we compare these to the results of a recent Commonwealth of Learning (COL) study of OER use amongst school teachers, higher education instructors and other education practitioners across the Commonwealth, a similar use rate of 47% emerges (COL, 2016). When the COL survey is disaggregated by region, however, 67% of Asian respondents and 63% of African respondents said that they had used OER, which is appreciably higher than the results revealed here. Yet it is difficult to make too much of this difference because COL's study surveyed a much broader array of educators (at all levels,

not just higher education) and did not appear to use a random sampling methodology similar to this one (which has implications for the likelihood of obtaining a representative sample of respondents).

The analysis in the rest of the chapter focuses largely on the data on instructors' OER use with the many variables that the survey covers, allowing for a better understanding of which factors are truly important for influencing OER use. For each variable, we start by sharing the assumption that guided our decision to highlight it as a variable. We then analyse the findings that are revealed by correlating the variable with the use responses. In most cases, figures or tables are provided to show the relevant responses by both country and region.

Instructors' demographics

The first set of variables to correlate with instructors' use of OER concerns demographic ones, including instructors' region, country, gender, age, digital proficiency, years of teaching experience, highest educational qualification, teaching discipline and position at their HEI.

Region and country

The assumption examined is that, based on the various economic and political differences that characterise the three regions studied, instructors' OER use should be positively correlated with higher levels of economic development, as such development provides opportunities for accessing and engaging with online educational platforms in greater depth and breadth (Lane, 2009). Essentially, the presumption is that the region or country that instructors live in should have an influence on OER use.

Figure 1 shows the percentage of instructors who said that they had used OER, were not sure if they had used OER or had not used OER, based on the region where they are located.
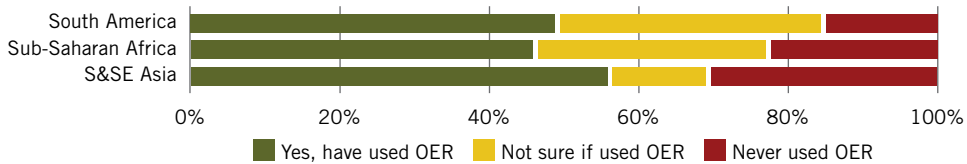

Figure 1: Instructor OER use by region

The data show that instructors from the South and Southeast Asian region had the highest comparative OER use rates, with 56% asserting that they had used OER before. South American instructors were modestly behind at 49%, and Sub-Saharan Africans at 46%. This means that there was only a 10% difference between the highest and lowest instructor OER use response rates; the three regions therefore show similarities in this regard.

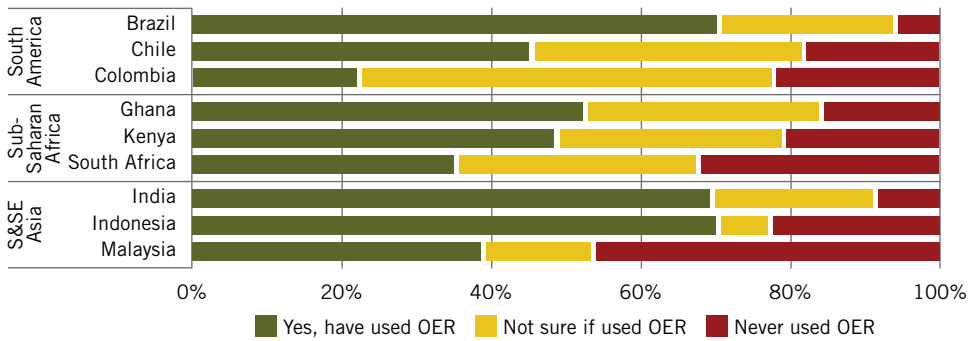However, a slightly different pattern of OER use amongst instructors emerges in individual countries (Figure 2).

Figure 2: **Instructor OER use by country**

At the national level, Figure 2 shows that the Brazilian, Indian and Indonesian instructors surveyed claimed the highest levels of use, at around 70% each. These positive rates were quite high compared to those of other regional countries, which tended to be below 50%. Thus, while 71% of Brazilian instructors surveyed said they had used OER, only 45% said the same in Chile and 22% in Colombia. It is important to note, however, that due to the low absolute response rates from Brazil (n = 17), Colombia (n = 9) and Chile (n = 23), these percentages must be treated with some caution compared to those from the other countries where there were more than 30 respondents each.

African instructors surveyed revealed a range of 35–53% OER use by country, with "unsure" rates at about 30% each. South Africa – the most economically developed country by GDP per capita (see Table 4) – had the lowest rate of instructor OER use compared to Ghana and Kenya. In this instance, it does not appear that national GDP per capita rates played a positive role in promoting OER use amongst instructors, comparatively speaking. In fact, an opposite phenomenon may be at play. Perhaps it is precisely the relative lack of "development" (as expressed through GDP per capita) – and all this might entail, such as less local educational publishing, etc. – that may have encouraged more Ghanaian and Kenyan instructors to consider the use of OER.

Table 4: **Gross domestic product (GDP) per country**

Country	GDP per capita (USD)	GDP per capita world ranking
Brazil	15 600	103
Chile	23 500	80
Colombia	13 800	115
Ghana	4 300	175
Kenya	3 200	186
South Africa	13 200	108
India	6 200	158
Indonesia	11 100	132
Malaysia	26 300	69

(Source: CIA, 2016)

A similar pattern is clear amongst the Asian countries. While Malaysia enjoys the highest GDP per capita (USD 26 300) compared to India (USD 6 200) and Indonesia (USD 11 100), it also has the lowest OER use rates (39%) of the instructor group. The other two countries boast markedly higher OER use rates of 70% each (with the caveat that only two Indian institutions were surveyed compared to four in the other two Asian countries).

Thus, based on the data provided here, we cannot sustain our assumption that instructors' OER use rates can be positively correlated to higher levels of economic or political development. Indeed, the data suggest the opposite – that it is instructors from countries that are less economically developed who have sought out more OER for use. A similar trend is apparent in the COL (2016) study, in which respondents from the regions of Africa (63%), Asia (67%), the Caribbean (70%) and the Pacific (64%) all claimed higher OER use rates than those in Europe (16%). This perhaps suggests that instructors from these countries or regions have had to be more resourceful than their colleagues in more developed countries and regions in seeking out non-traditional educational materials that suit their needs from a cost and accessibility perspective. However, our data cannot confirm this with certainty, but it raises important questions about how and where OER is being used in the Global South, nuancing our understanding of educational practices across the regions.

Gender

The assumption tested here is that gender is often a differentiating factor in people's access to education and technology (Takeda & Homberg, 2013). Because of this, we would expect that there might be a mild association between greater gender privilege (e.g. for males in relatively patriarchal contexts) and higher OER use because OER is a pedagogical innovation that sits at the intersection of education and technology.

Figure 3 shows the percentage of instructors surveyed who said that they had used OER, were not sure if they had used OER or had not used OER, based on their gender and distinguished by region.
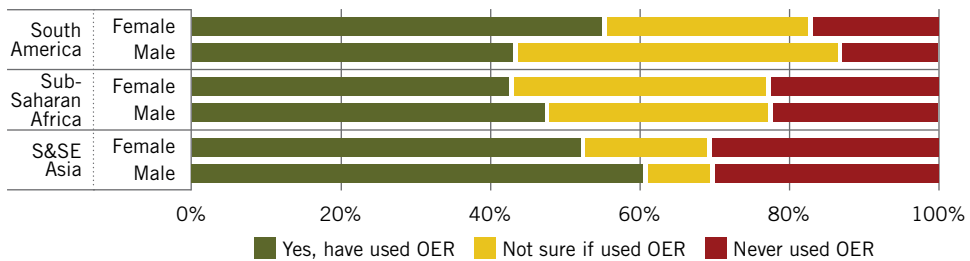

Figure 3: Instructor OER use by gender per region

Among the instructors who said that they had used OER, in South America the male/female rate was 43%/55%, in Africa it was 48%/43%, and in South and Southeast Asia it was 61%/52%. Thus males had slightly higher "yes" rates in Africa and Asia, but lower in South America. These findings suggest that there weren't major differences between gender responses to OER use amongst instructors in the three regions. In fact, the differences between regional responses tended to be mirrored in the gendered results of those regions,

meaning that regional trends about instructor OER use tended to be stronger than gender trends about OER use.

This argument is further reinforced at the national level (Figure 4), but in a nuanced manner. In Africa, there was a great discrepancy in Ghana between female instructors who appeared to be less certain of their OER use (71% said they were "not sure") compared to their male counterparts (21%). This corresponded to the large difference in OER use response, with 29% of females reporting having used OER compared to 58% of males. These gendered differences appear to be substantial and may emanate from a cultural or economic distinction within Ghanaian society, but without further information it is impossible to discern from the data why OER use in particular would be gendered in this way. Caution is further warranted by the fact that this gender distinction is reversed in Kenya, with greater female use (60%) compared to male (43%), though in less extreme terms.

Figure 4: Instructor OER use by gender per country

In general, these data do not support the assumption about gendered OER use amongst instructors. In certain countries, there might be some mild gender differences, but they are just as likely to show greater female instructor use than male. This apparent randomness is likely due to the fact that, since all of the survey respondents worked in higher education contexts with some degree of access to the internet and OER platforms, respondents' gender would probably not have been the key variable in whether they used OER or not. Gender would certainly shape numerous elements of the respondents' lives, but it is not clear that it does so with regard to OER use.

Age

The assumption is that the age of instructors can have an impact on the pedagogical traditions and commitments that they hold, stemming both from the values that shape their actions at different points of their lives, and the types of technologies to which they are exposed at critical moments of their teaching-style development (Friemel, 2016). In this case, we imagine that one of two possible contrasting outcomes will occur with OER use based on age: that older instructors who are secure in their identities and positions as instructors will feel more open to new pedagogical innovations such as OER; or that younger instructors will be more likely to be "early adopters" of OER because they emerge from a digital ecosystem in which younger people feel more comfortable.

Figure 5 shows the percentage of respondents who said that they had used OER, were not sure if they had used OER or had never used OER, by age and region.

Figure 5: Instructor OER use by age group per region

For South America, the younger age brackets of instructors show a relatively greater OER use uncertainty, with "not sure" being the highest response for the first three age brackets (i.e. 25–35). The middle three age brackets (36–50) show the "yes" response as the highest, corresponding with greater certainty about use or non-use. The next bracket (51–55) shows

an equal number of "not sure" and "no" responses, while the final two brackets (56+) show only "yes" responses. (Note that in the case of South America there were no respondents in the 61–65 age category; there were also no respondents in Sub-Saharan Africa younger than 25.) These numbers suggest that younger instructors are less certain whether they have used OER than older instructors. Middle-aged instructors are more likely to have used OER, while the older instructors show a mixture of positive and negative responses. (However, it is worth noting the relatively small absolute numbers involved for the South American data, as the total number of regional respondents [n = 59] is spread across nine age categories.)

In Africa, it was harder to discern any patterns with regard to age, as there are high levels of non-use amongst instructors across all the age categories, and relatively low levels of certainty. Only in a few of the age categories was OER use higher than both uncertainty and non-use, but with no apparent reason.

In Asia, respondents in six of the 10 age categories said that they had used OER. Only those between 31–40 years old (n = 47) were less likely to have used OER, as well as those over 66 (n = 1). The data confirm the impression established above about the general regional profile, where certainty of OER use or non-use is relatively high across the age categories.

When it comes to the activities of younger instructors, they did not reveal "early adopter" approaches to OER in their responses. In fact, younger instructors were more likely to reveal a lack of certainty about whether they had ever used OER, as indicated by the yellow bars in Figure 5.

The quantitative research approach taken here has not revealed a strong association between the age of instructors and their OER use, but qualitative research could be employed in future to better understand the ways in which age might shape instructor OER use, even if unevenly and idiosyncratically.

Digital proficiency

The assumption assessed here is that OER use requires some level of digital literacy, thus the levels of OER use for instructors should be higher for those who are more digitally proficient (ECDL, 2011). Figure 6 shows the percentage of instructors who said that they had basic, intermediate or advanced digital literacy, distinguished by country and region.
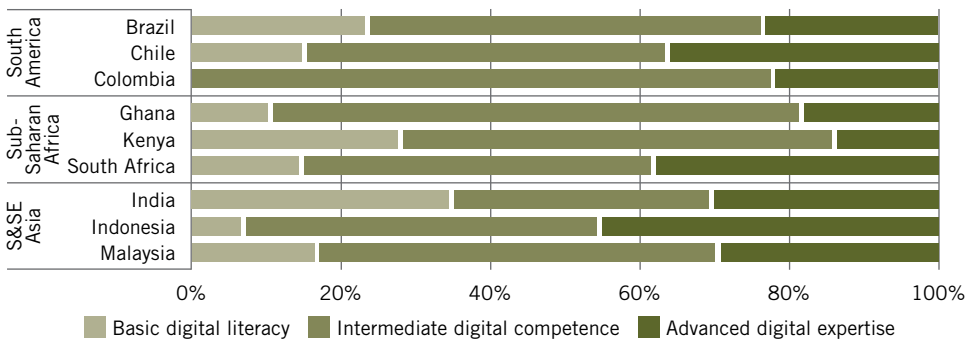

Figure 6: **Instructor self-reported digital proficiency by country**

These findings are based on self-reporting, meaning that respondents assessed themselves subjectively according to these three categories, but they show that – if the numbers are aggregated and viewed as a whole – the majority of instructors viewed themselves as having intermediate digital competence (54%), followed by advanced digital expertise (29%) and, more rarely, basic digital literacy (17%).

Figure 7 shows how these self-reported digital proficiency claims align with instructors' OER use. It suggests that, at a national level, self-reported digital literacy levels do not have a consistent upward impact on OER use. That is, there is no consistent increase in OER rates moving from the basic digital literacy category to the intermediate to the advanced. In reality, while instructors with basic digital literacy had the lowest levels of OER use (as expected), the majority of instructors stating that they had used OER identified themselves as having intermediate, not advanced, levels of digital competence.

While the Kenyan and Indonesian instructors claiming to have advanced digital proficiency were more likely to be OER users than the other categories, it was the opposite in Chile. The responses elsewhere showed mixed results, making it impossible to state strongly that there is a definite association between instructor digital proficiency and OER use.
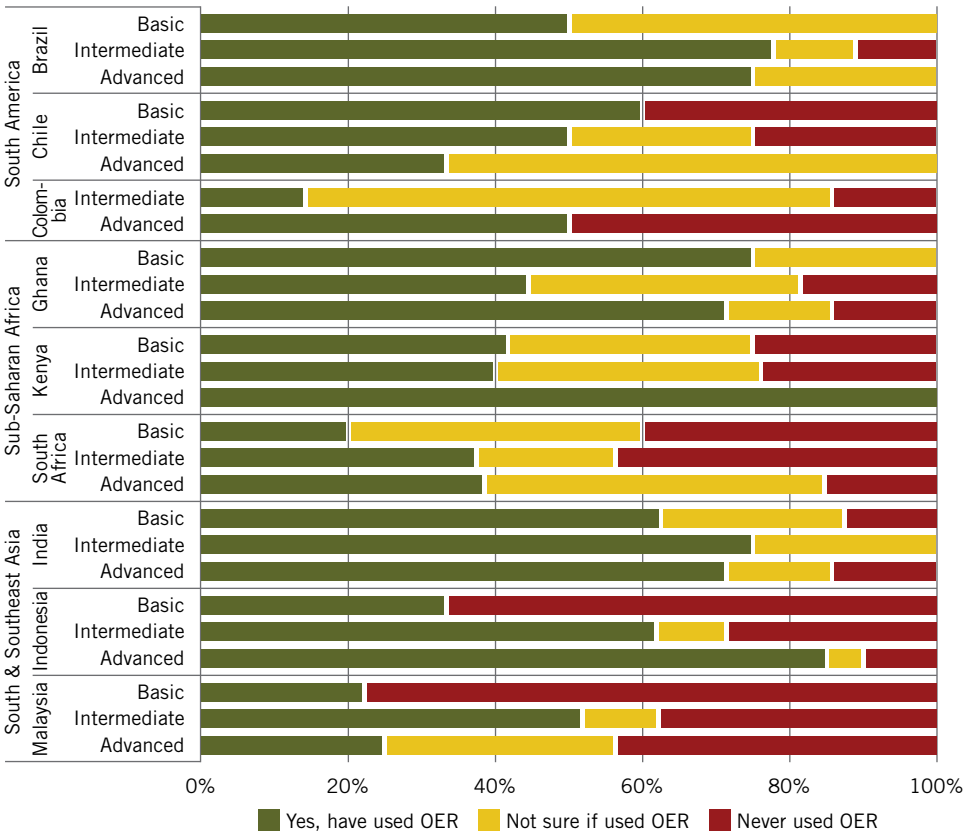

Figure 7: Instructor OER use by self-reported digital proficiency per country

In fact, the profile of basic, intermediate and advanced self-identifiers is essentially the same for OER users as it is for non-users and those who don't know, as shown in Table 5.

Table 5: Instructors' digital literacy profiles according to region and OER use response

Region	Basic digital literacy (%)	Intermediate digital competence (%)	Advanced digital expertise (%)
South America	15	54	31
Sub-Saharan Africa	18	59	23
South and Southeast Asia	17	48	36
Global South (totals)	17	54	29
Global South (OER users)	14	53	33

If it is the case that self-reported digital proficiency is not highly correlated with OER use patterns, then it means that the digital proficiency required to engage in OER use might be quite low. The fact that OER use is a very broad category of activity makes it difficult to interrogate this in detail because there are many types of OER that are easily available for quick and immediate use and insertion in one's own teaching materials, such as YouTube videos (for "as is" use) and Wikimedia images. Instructors do not necessarily need high levels of digital proficiency to engage with these sites, although they may require more sophisticated skills for engagement with other types of OER-specific teaching platforms.

The assumption of a correlation between instructor digital proficiency and OER use is not convincingly proved, but neither is it disproved. There is a mild potential relationship, though not a strong one. It appears that OER use is enhanced by instructors possessing *a certain minimum level* of digital proficiency – somewhere between basic and intermediate – that allows them to engage with OER with some confidence. The low levels of OER use amongst instructors with basic literacy skills confirm this, while the relatively high rates amongst those with intermediate skills do so as well, pointing to some level between those categories that allows for greater OER use. Having advanced digital proficiency, however, did not seem to increase the likelihood of OER use above that of instructors with intermediate skills.

Highest educational qualification

Our underlying assumption was that OER use rates should increase relative to instructors' higher levels of qualification (Lane, 2009), based on their exposure to a more extensive range of disciplinary materials through their academic studies. Figure 8 shows the percentage of instructors who said that they had used OER, were not sure if they had used OER or had not used OER, based on their highest educational qualification and distinguished by country and region.

In South America, instructors of each country surveyed were more likely to have used OER if they did not have PhDs. There was a mild association with OER use and comparatively lower educational qualifications. The same was also true in three other countries, with only Kenya, India and Indonesia showing responses suggesting that possession of a PhD was associated with higher OER use than was the case for lower qualifications.

This outcome contradicts the assumption of a correlation between OER use rates and level of qualification. This might be because instructors without a PhD are more likely to look to other providers of educational materials for their teaching than to develop everything from scratch themselves. They may not consider themselves full "experts" on a subject and thus are happy to look to other educators' materials for support. Additionally, these instructors may have

earned diplomas, bachelor's or master's degrees with the express aim of focusing on teaching – rather than research, as might be the case for those with PhDs – and thus have spent more time and energy seeking out innovative materials for their teaching. More evidence is required for advancing this supposition but we can ascertain that, at least according to these data, the assumption that educational qualifications are positively related to OER use does not hold.
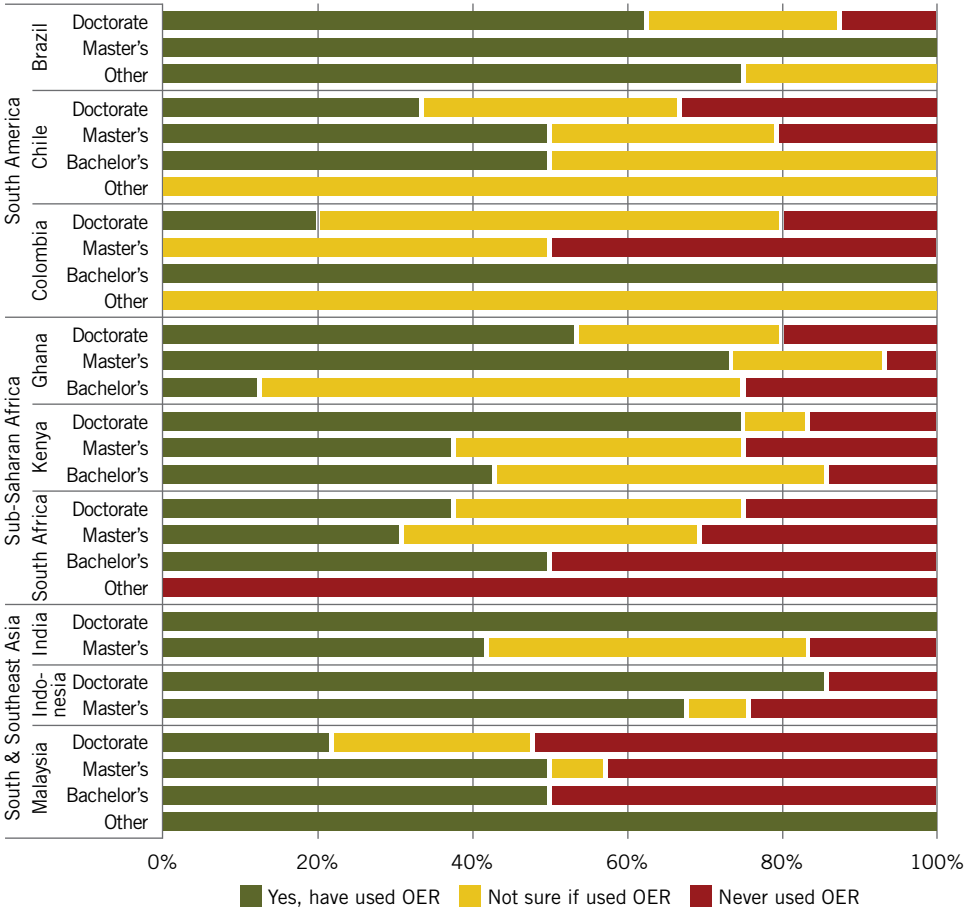

Figure 8: **Instructor OER use by highest educational qualification per country**

Teaching discipline

The assumption being tested here is that every academic discipline has different norms and expectations around sharing materials openly or even collegially (between colleagues, not openly). They also have different types of materials that would be shared, with some being easier or more pertinent and useful than others. Based especially on the insights of Coughlan and Perryman (2011), we assume that disciplinary norms around sharing would influence the number of OER generally available, and whether one engages in the use of OER.

Table 6: **Disciplinary area of teaching associated with OER use across all three regions (more than one answer allowed)**

Discipline	Number of instructors	OER users (%)
Humanities and Arts	54	44
Social Sciences (including Education and Law)	95	54
Management and Commerce	43	47
Natural Sciences	70	64
Engineering and Technology	89	55
Agriculture and Veterinary Sciences	3	0
Medical and Health Sciences	34	50
Other	9	56

The numbers of respondents per discipline are too small to make any convincing arguments about each discipline's influence on OER use at a country or regional level. However, at the Global South level, Table 6 shows that discipline may have a mild effect on OER use rates. Most disciplines reported an OER use rate of 44–56%, hovering around the 50% mark. Only Natural Sciences showed a substantially higher use rate at 64% (the 0% of Agriculture and Veterinary Sciences can be discounted for having too few respondents to be meaningful). This might be due to a greater culture of sharing educational materials within Natural Sciences – or as Coughlan and Perryman (2011) argue, within the "hard pure" and "hard applied" sciences versus the "soft pure" disciplines of the Humanities – or perhaps there is greater pedagogical utility for using OER in this discipline versus others. The survey did not seek to identify why such a situation might be the case in any particular discipline, but simply to determine whether any differences existed.[2]

Given the similarity in OER use rates across most of the disciplines, the assumption around disciplinary differentiation is not well supported by the survey data. However, the slight outlier of the Natural Sciences and the general higher percentages of the hard sciences over the Humanities suggest that more research would be valuable in this area.

Position at HEI

The assumption being examined here is that the position instructors hold at an HEI will influence their teaching practices (Oyelaran-Oyeyinka & Adeya, 2004a), including whether or not they are exposed to OER and use it. We assume that position matters for OER use and will have a telling effect on instructor OER use response rates.

Table 7 shows that the range of OER use responses is quite narrow (52–55%) amongst junior, mid-level and senior instructors. This largely matches the total use rate of 51% across the Global South. The two outlier categories – those of "administrator" and "teacher" – have relatively small respondent numbers. It is thus difficult to make broad generalisations about why administrators appear to use OER far more than the average instructors, or why teachers appear to use OER far less than them.

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2   No significance tests have been performed to substantiate statements in this regard.

Table 7: **Instructors' position at institution associated with OER use (more than one answer allowed)**

Position	Respondents (total)	OER users (%)
Administrator	16	69
Manager	17	53
Teacher	10	40
Junior academic (lecturer, etc.)	128	52
Mid-level academic (senior lecturer, etc.)	100	55
Senior academic (associate/full prof.)	67	52
Other (researcher, etc.)	43	53

It is worth stating that the question did not require respondents to choose only one category for describing themselves. They could choose more than one, such as senior academic and manager – a description that would fit many respondents who fill multiple roles at their institutions. Thus, the relatively high OER use rates of the administrators are not exclusive of the academic responses, though they may suggest that academics with multiple roles – especially where they facilitate the work of other instructors – may encourage higher OER use. They may be placed in a position to have a pedagogical influence on others and thus take an interest in gaining exposure to the current trends shaping teaching practice, which would include OER. This is speculation, begging further research.

Based on the data from the survey, the assumption of a clear relationship between position held at an HEI and OER use is not well supported. There is no strong indication that academic rank or institutional position has an influence on OER use. While each institution's prevailing culture (Cox & Trotter, 2016) might shape this relationship differently, the three levels of academic positions showed similar OER use rates, thus reducing the likelihood that such hierarchical considerations are key to understanding different OER use rates in the Global South. However, the outlying responses of the "administrators" (an admittedly small group here) suggest that more in-depth research would be useful on this question.

Infrastructure

The second set of variables for comparison with respondents' use of OER concerns infrastructure, including instructors' location of internet access, devices to access the internet, and internet cost, speed and stability.

Location of internet access

The underlying assumption is that as engagement with OER is largely an optional activity for instructors, one would expect to find higher levels of OER use in contexts where respondents access the internet in locations where they enjoy higher levels of comfort, ease and privacy (such as at home or at work rather than in a public setting) (Jackson et al., 2006).

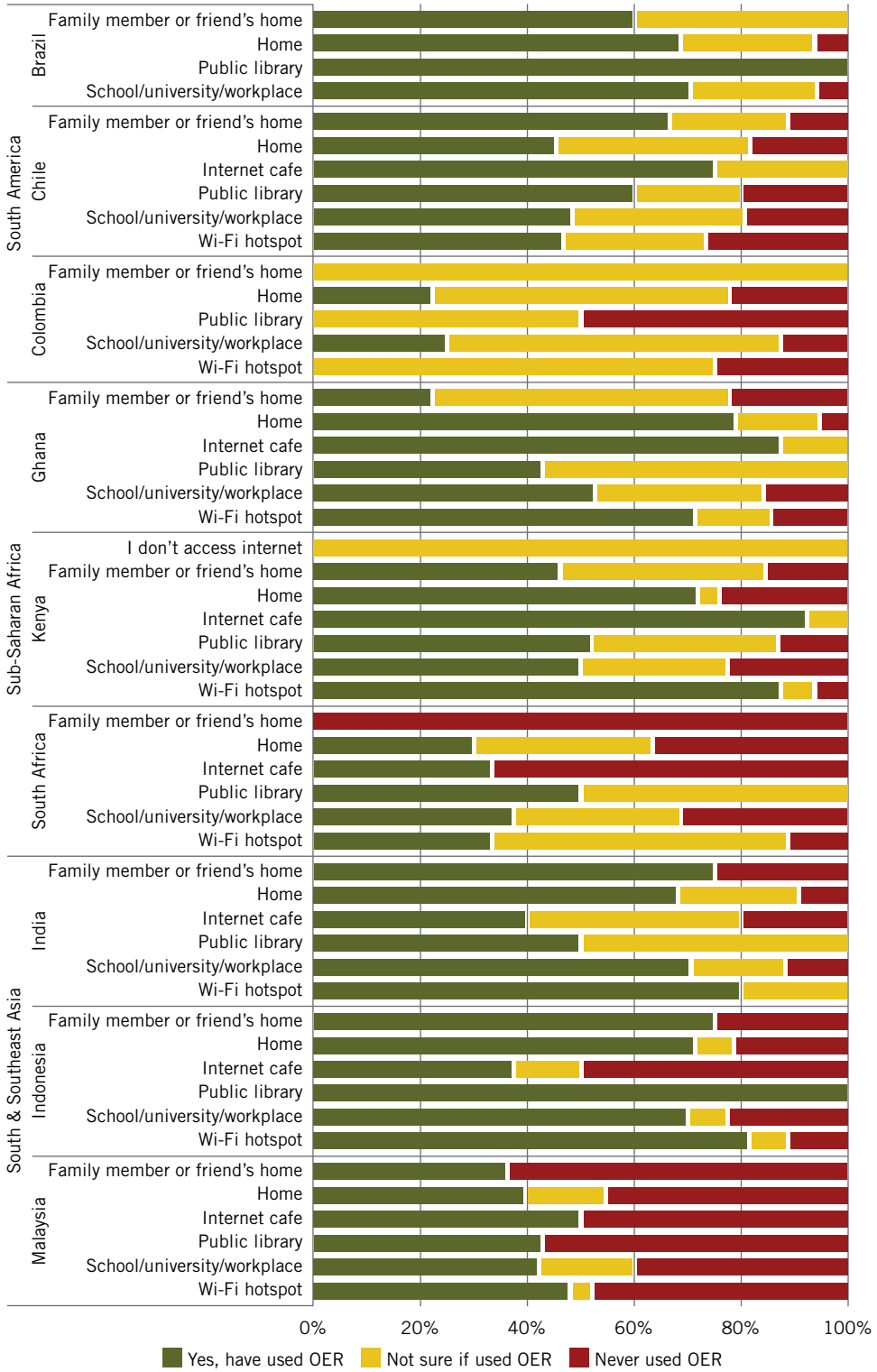Figure 9 shows instructors' OER use rates by location of internet access per country.

Figure 9: Instructor OER use by location of internet access per country

The data revealed no discernible pattern nationally regarding where instructors access the internet and whether they have used OER or not. For instance, in South America, Chilean responses suggested that all locations were positively correlated with using OER, while in Colombia all places were negatively correlated. In Africa, Ghanaians and Kenyans were more likely to use OER if they frequented internet cafes, but this was not so in South Africa.

In Asia, respondents using Wi-Fi hotspots were more likely to use OER than those who accessed the web from internet cafes. In fact, the data show that the response rates tend to resemble those of the respective countries and regions in general in this dataset. Thus, the positive response by Indonesians at all internet locations is relatively high compared to Malaysian respondents, who, as a country, already showed a low OER use rate.

Part of the challenge with interpreting the responses to this question is that the answer possibilities are not exclusive, meaning that respondents could list multiple places in which they engaged with the internet, such as at home and at an internet café. Moreover, the characteristics of these different locations can be quite different nationally. Public libraries in some countries may be better equipped for accessing the internet than in other countries, making them difficult to compare.

Thus, the assumption that the location of internet access should influence OER use does not appear to hold, at least not in any obvious way. There are definitely national and regional differences regarding OER use rates, but they do not appear to be highly influenced by the types of locations that respondents use to access the internet. For instructors who most likely enjoy a general level of internet access at work by virtue of their employment at an HEI (though internet stability and speed might be variable), the simple ability to access the internet from different locations may not be a defining feature of whether they use OER or not.

Devices used to connect to the internet

Another related assumption is that the types of devices that instructors use to access the internet affect their OER use (Ericsson, 2014).

Respondents were asked whether they used the following devices to access the internet: desktop computer, laptop computer, mobile phone, tablet. They could choose more than one device. Figure 10 shows instructors' OER use rates according to the devices they use to access the internet.

Figure 10 reveals that in South America the instructor OER use rates were basically the same for each device per country. There was also no marked difference in OER use rates between the different devices used in each country. This suggests that the particular type of hardware that instructors have access to does not make much difference as to whether they use OER or not. However, the fact that this is not an exclusive question also makes it difficult to see which type of device would actually make a difference.

In Africa, instructors who had tablets in Ghana and Kenya reported a noticeably higher level of OER use than those using other devices. In these contexts, it might be that the tablet is a relatively rare, high-tech device (compared to the ubiquity of mobile phones and computers) that reveals a certain level of technological investment and interest. Thus tablet owners may be more likely to use the pedagogical offerings available on the internet, including OER.
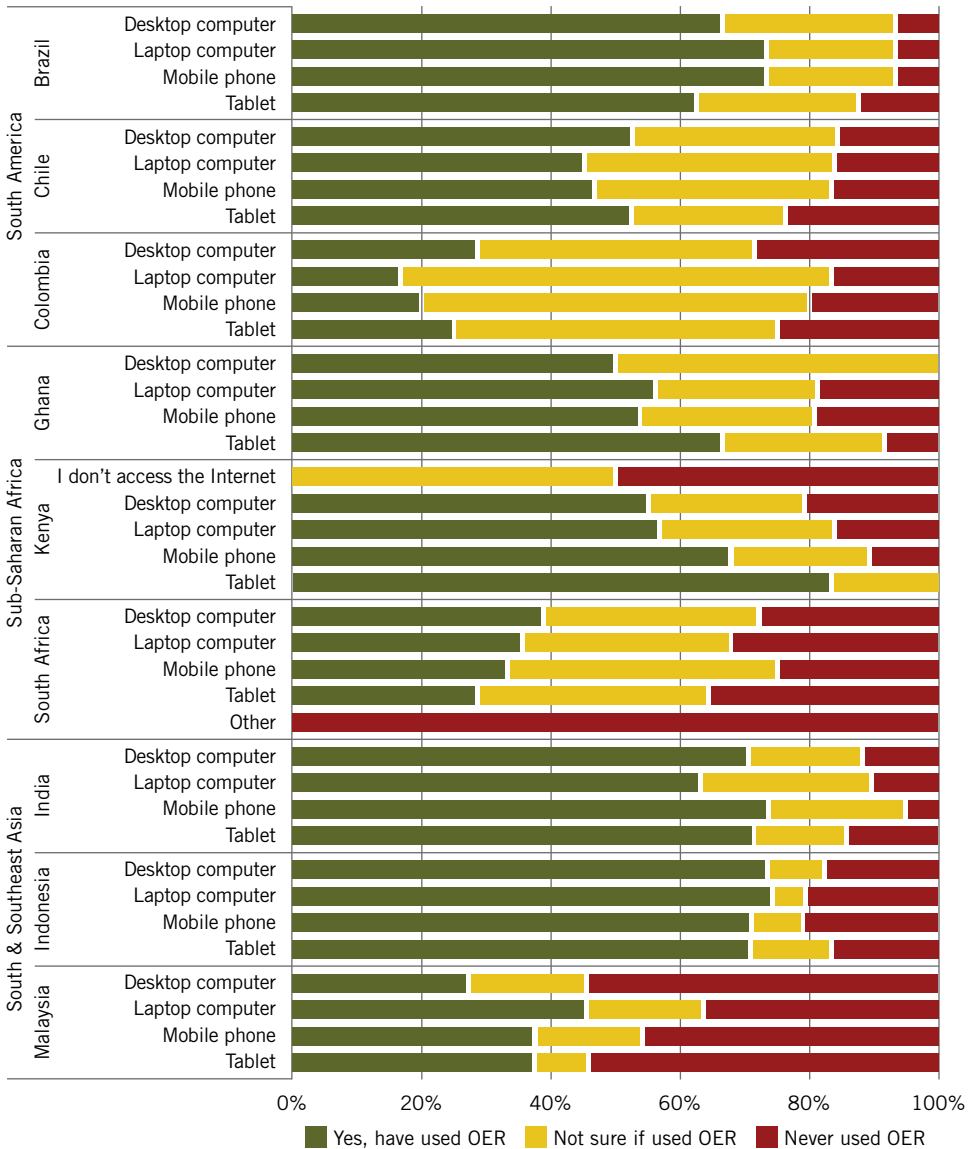
Figure 10: Instructor OER use by devices used to access internet per country

In Asia, there was very little variation of OER use within a country based on the type of device that instructors used to access the internet.

Thus, the type of device used to access the internet may not make as big a difference for HEI instructors and their likelihood of OER use as was assumed. These are people who likely have multiple devices, such as laptops and mobiles, and perhaps even desktops and tablets. In most countries, OER use rates were similar across devices, suggesting that the national character of OER use was not highly influenced by the particular device used to access the internet.

Internet cost

The assumption being scrutinised is that internet costs (as expressed through levels of satisfaction) should affect OER use, in that they influence the amount of time users spend on the internet, and the type of activities they engage in (Herrera, 2010). We assume that higher satisfaction would mean that internet access is cheaper and therefore more available for potential users.

Respondents were asked to rate their satisfaction with their internet costs according to the following prompts: satisfied, unsure and dissatisfied. Figure 11 shows instructors' OER use rates according to their perception of the costs.

Figure 11: Instructor OER use by perception of internet cost per country

This question seeks to tease out a subjective element of the internet access experience, that of instructors' perception of the costs associated with accessing it, and to tie it to OER use practices. This subjective approach has a number of challenges, especially because the perceptions invoked can be based on quite idiosyncratic criteria for respondents. For instance, wealthier respondents might feel more satisfied with the costs than poorer respondents, or vice versa, but it is impossible to know based on the data yielded by the question. But this subjective approach was preferred over a more "objective" measure, such as the literal, numerical cost of internet bundles per megabyte. Given the massive differentials between exchange rates, purchasing power per currency unit and an ever-fluctuating currency market environment, it would not have made this issue any clearer by determining that the price of a megabyte was cheaper or more expensive in one country than another, given all the factors that influence the impact of that megabyte price on respondents. Thus we preferred to simply ask for respondents' perceptions on connectivity costs with the hope of determining whether this subjective experience of an otherwise objective reality influences OER use.

Only instructors in Kenya and Indonesia showed our expected trend of higher satisfaction being associated with higher OER use. In other countries, this trend was either reversed or non-existent. Indeed, because the Kenyan and Indonesian experience was not the case anywhere else, it is impossible to make any broad generalisations about instructors' level of cost satisfaction in accessing the internet and their level of OER use. Thus the assumption that internet costs affect OER use cannot be sustained.

Internet speed

An associated assumption is that higher levels of satisfaction with internet speed affect levels of OER use, as speed should influence the quality and effectiveness of instructors' engagement with the internet in general (Hassani, 2006).

Figure 12 show instructors' OER use rates according to their perception of their internet speeds. As was the case with internet costs, satisfaction with speed does not appear to have an important influence on whether instructors use OER. It was only associated marginally in Indonesia. This might be explained by the fact that the OER question does not refer to general repeated use of OER, but rather at "any time in one's life", which would not necessarily be related to a general sense of satisfaction with internet speed.

Thus, we would need a more precise type of data (rather than general speed satisfaction versus possible one-time use) to understand the role of internet speeds on OER use. Moreover, for instructors who may enjoy fast internet speeds at home but not at work, or vice versa, this question does not differentiate between them. Further research would need to be far more detailed to draw specific conclusions.
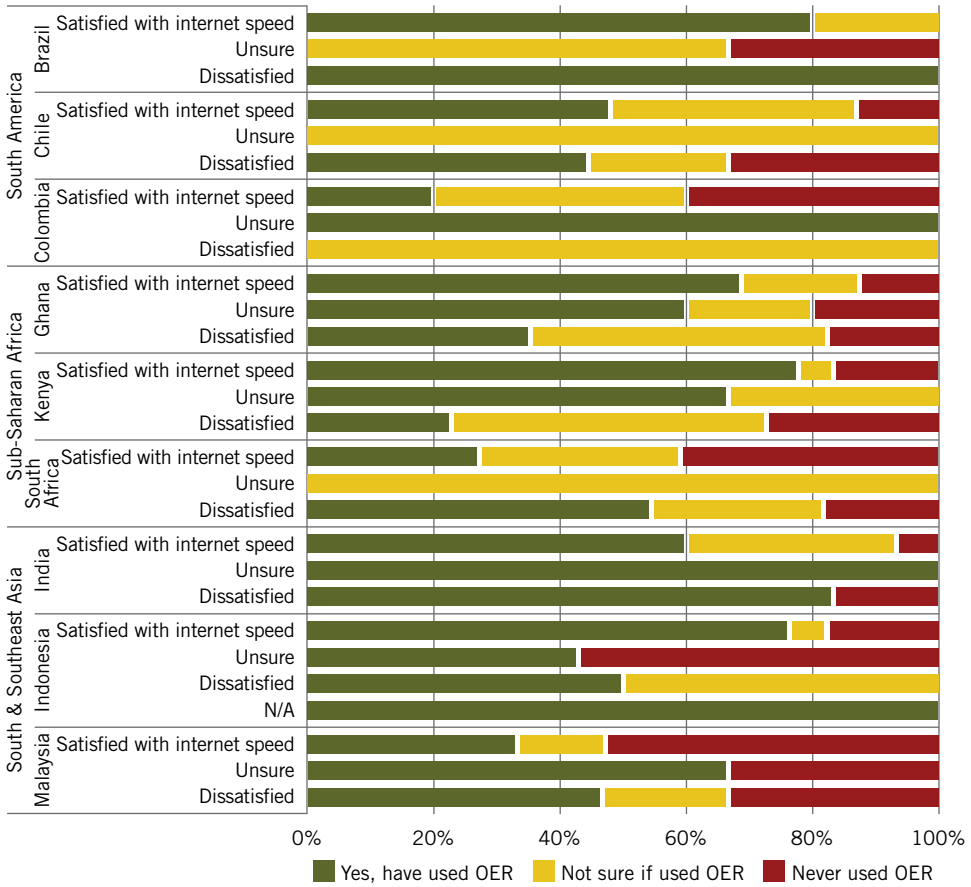
Figure 12: Instructor OER use by perception of internet speed per country

Internet stability

The assumption under scrutiny here is that higher levels of satisfaction with internet stability affect levels of OER use (Oyelaran-Oyeyinka & Adeya, 2004b), as stability is likely to influence the quality and effectiveness of instructors' engagement with the internet in general.

Figure 13 shows instructors' OER use rates acccording to their perception of their internet stability. Though one would reasonably assume that the stability of instructors' internet connection would influence their internet use at the OER use level, only in Kenya do instructors suggest that their level of internet stability satisfaction is related to their OER use. Again, there may be many reasons for this, but it appears that most instructors enjoy at least some level of minimum internet stability to be able to achieve their online goals, whether related to OER use or not. Thus, while stability may impact internet use at a general level, it does not appear to impact whether instructors have "ever" used OER or not.
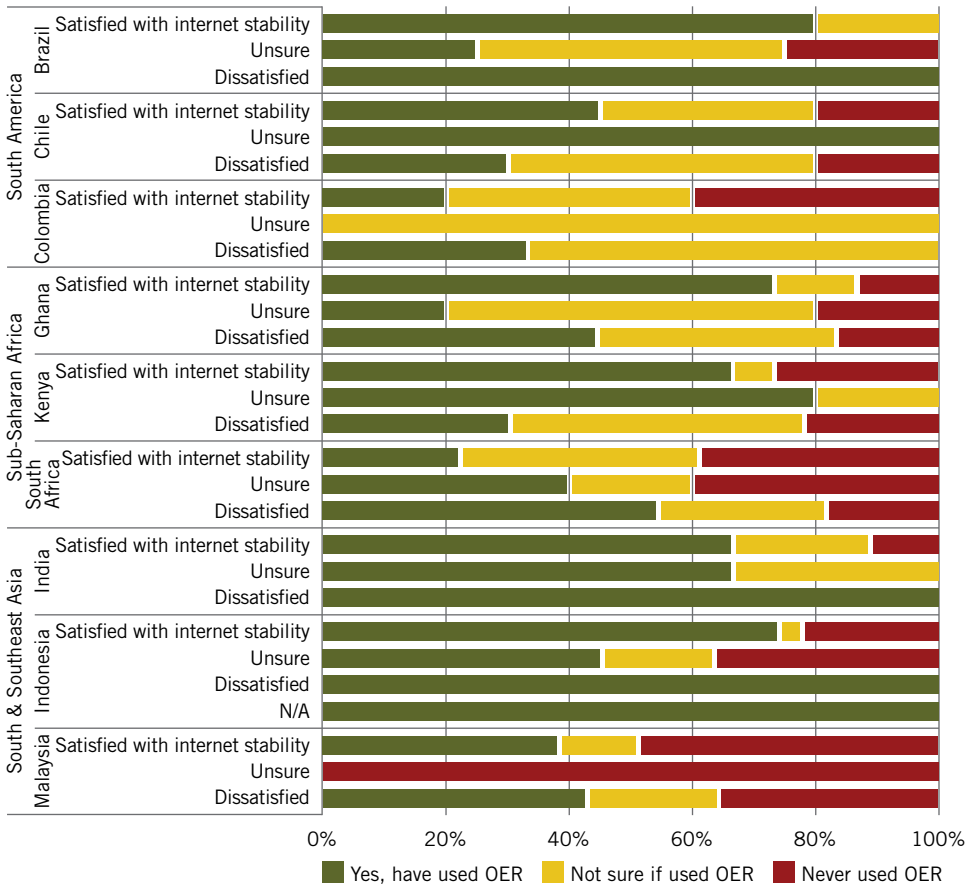
Figure 13: Instructor OER use by perception of internet stability per country

Institutional environment

The third factor related to instructors' use of OER concerns institutional variables, specifically the institutional perspective on OER.

Institutional perspective on OER

The underlying assumption is that OER-related institutional policies influence whether instructors use OER or not (Allen & Seaman, 2012; Harley & Lawrence, 2007; Nonyongo, 2013).

Respondents were asked to rate their degree of awareness of whether institutional policies support OER according to the following prompts: agree, neutral, disagree and not available/not aware.

Figure 14 shows respondents' assessment of whether their institutions have policies that support the adoption of OER, distinguished by country and region.
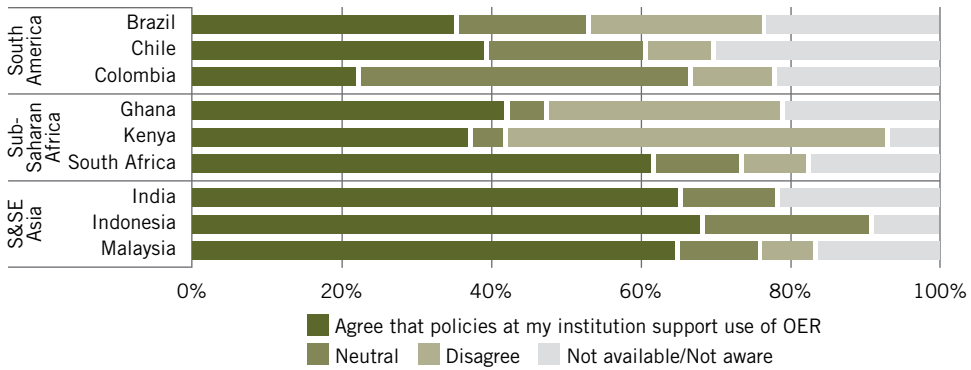
Figure 14: Instructor perceptions of whether their institutions have policies that support OER

The data show that the majority of respondents in four countries – South Africa and the three Asian countries – believe that their institutions have policies that support OER, while only a minority in the other five believe the same about their institutions. Indeed, the sizeable difference in the positive response rates for these two groups of countries would suggest that, if this is the case, the OER use rates in the different countries would also be comparably affected.

In reality, we do not see a clear alignment of OER use rates by the instructors and their perception of OER-related institutional policies. If we compare the OER use response percentages from Table 3 with the responses in Figure 14, we see a mixed result. For instance, the OER use rates for instructors (drawn from Table 3) from Chile (45%) and Colombia (22%) are low, which conforms to the low-level agreement regarding pro-OER institutional policies. In addition, 70% of Indonesian instructors said they had used OER, which corresponds well with the 68% of respondents who said that their institutions had positive OER support policies. However, a minority of Brazilians (35%) say that their institutions have pro-OER policies, but a majority (71%) say that they have used OER. Most South Africans (63%) say their institutional policies support OER, but only a minority (37%) have used them. These contradictory results suggest that some responses appear to support the assumption while others do not.

Part of the challenge in interpreting this question is that we did not define the characteristics of a pro-OER policy for respondents, which means that they were free to determine this in their own minds. This reduces the comparability of their responses. However, it was difficult to impose any strict definition of what a pro-OER policy entails as it would never be able to account for the myriad ways in which different institutional policies might influence OER adoption. Thus, we wanted to leave this for respondents to decide for themselves, even if it meant that we did not learn what exactly those policies entailed and why the respondents perceived them in the way that they did.

In fact, given that many of the respondents from the same institutions held different perceptions about the OER-related merits of their institutional policies, this suggests that either the policies were open to interpretation (especially if they did not refer to OER explicitly) or the respondents had differentiated expertise in understanding the details of their policies as they relate to OER.

In either case, the assumption that OER-related institutional policies influence whether instructors use OER or not is neither proven nor disproven based on these data. Thus we continue to assume that institutional policy remains a salient factor in OER use, though not necessarily the most important one for many instructors who have engaged with OER for other reasons.

Instructor attitudes

The fourth set of variables related to respondents' use of OER concerns their perspectives on the legal issues relating to use of teaching materials available on the internet, and users' willingness to use OER again in the future.

Perspective on legal use of materials on the internet

The underlying assumption is that instructors' perceptions of which online materials they feel free to use will affect their use of OER, either reducing their likelihood of seeking them out (such as those who feel free to use "anything on the internet") or increasing their likelihood (such as those who feel that they should only use openly licensed materials).

Figure 15 shows the comparative responses given to the prompt of which online materials instructors feel free to use for their teaching, distinguished by country and region. They are raw numbers, and respondents could answer more than one field.

The purpose of this question was to get an idea of instructors' understanding of the legal dimensions of online digital materials and its impact on their OER use. It was asked to assess their awareness of the distinctions between OER and other online materials and to establish which concepts guided their activity. The results revealed many instructors' relative lack of awareness surrounding OER, and also hinted at why there may not be much of an incentive to learn more about it.

As Figure 15 shows, one of the top responses in most countries was that instructors felt free to use materials "covered by 'fair use' regulations". "Fair use" (also referred to as "fair dealing" in certain contexts) refers to the right instructors have to freely use a portion of copyrighted materials for educational purposes without requesting permission from the copyright holder, usually for illustrative purposes in a teaching setting (Band & Gerafi, 2013). This may amount to a small sample of the copyrighted materials, though the precise amount may differ according to jurisdiction. Not all countries make provision for "fair use" regulations in their copyright regimes, but many instructors nevertheless feel they are covered by this provision in their use of online materials. Such claims of "fair use" may also refer to instructors' traditional practices of "borrowing" that are rarely, if ever, legally challenged.
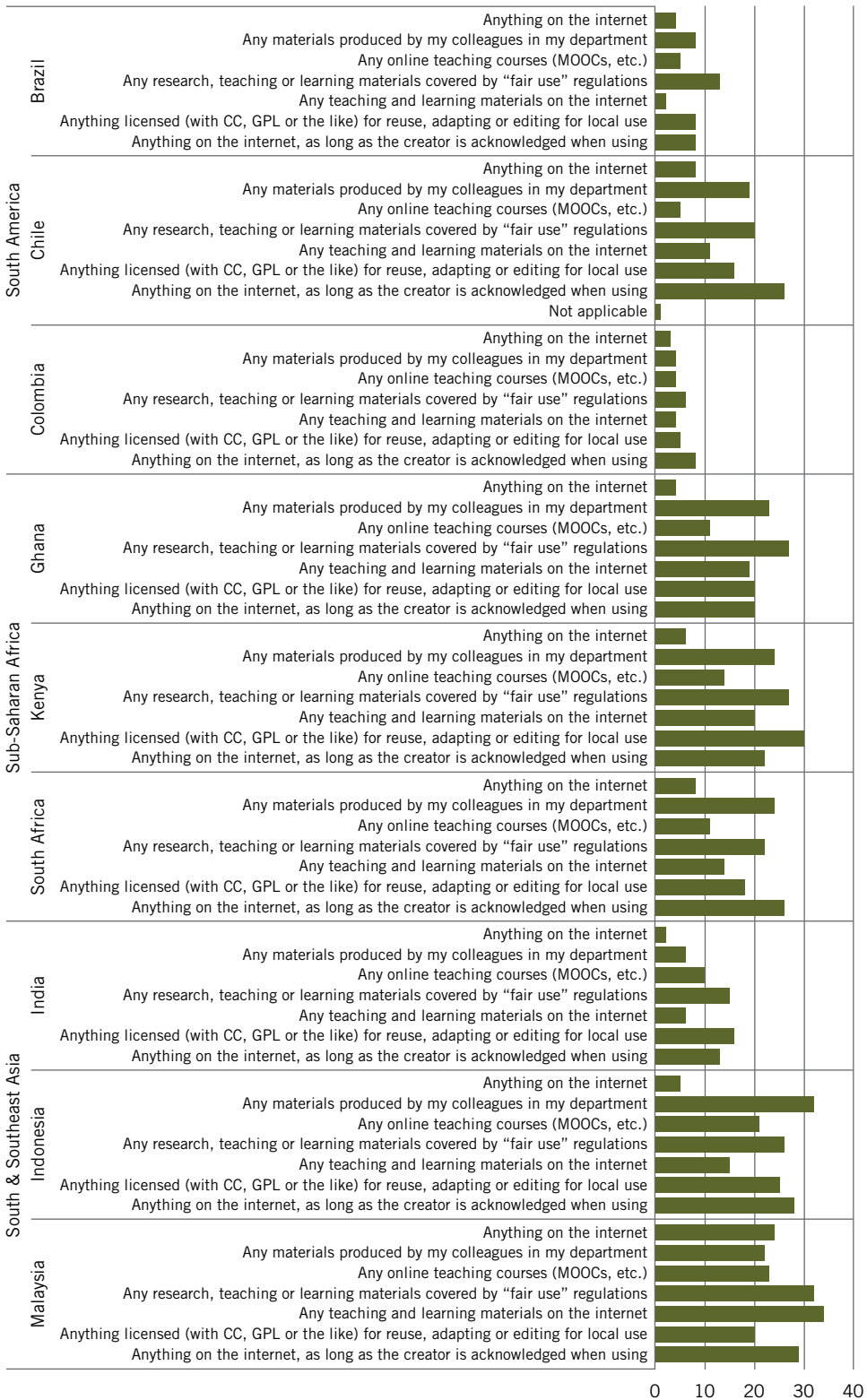
Figure 15: Instructor responses to prompt "Materials you feel free to use for teaching" (raw numbers)

The "fair use" principle could arguably be applied to almost any type of material found online. That is, for the respondents who said that they felt comfortable using "anything on the internet", they may not necessarily hold this position because they have no regard for copyright or the law. Rather, they may feel that anything on the internet can be used for educational purposes because of the fact that "fair use" conventions shaping educational practice can be vague and very challenging to interpret. However, such a response may also reveal a more activist defiance of copyright regimes, in which instructors use anything they like on the internet because they want to offer the best possible education to their students regardless of copyright legalities. It may also suggest that the defining feature of an online resource for most instructors is not its *legal status* ("anything licensed for reuse, adapting or editing"), but rather its *purpose* ("any teaching and learning materials on the internet", especially for Malaysians), *provenance* ("any materials produced by my colleagues in my department", especially for Indonesians), *acknowledgeability* ("anything on the internet, as long as the creator is acknowledged when using", especially for South Africans), or, less so, *formality* ("any online teaching courses").

These responses reveal a variety of approaches to online materials and instructors' comfort in using them, but what do they say about the likelihood of instructors' OER use?

Figure 16 shows the percentage of respondents who said that they had used OER, were not sure if they had used OER or had not used OER, based on their response to the prompt of which online materials they felt free to use for their teaching, distinguished by country and region.

The figure shows a strong association between the likelihood of OER use and feeling comfortable using "anything licensed openly". In South Africa and Indonesia, this was the top response; it was also a top-three response in Chile, Colombia, Ghana, Kenya, India and Malaysia. This suggests that those who have an understanding of the legal implications of open licensing are also more likely to have used materials that are specifically licensed as such. It also shows a low association between OER use and respondents feeling free to use "anything on the internet", suggesting that those who do not care about the legal distinctions of online materials also do not make any special effort to use OER – they just use whatever they find (which may not, in many cases, be legally open).

Interestingly, only in Ghana and Kenya was "fair use" associated with OER use. Elsewhere there was more of a middling response. This may suggest that those who are comfortable using materials under "fair use" provisions do not go out of their way to seek OER, as essentially any type of material – whether open or closed – can be used for teaching purposes (again, within the limits established in their jurisdictions). Such a sensibility may in fact reduce the attraction of OER because they comprise just a small subset of all possible materials found on the internet, which, according to instructors' perception of the "fair use" principle, are useable within a particular educational context.
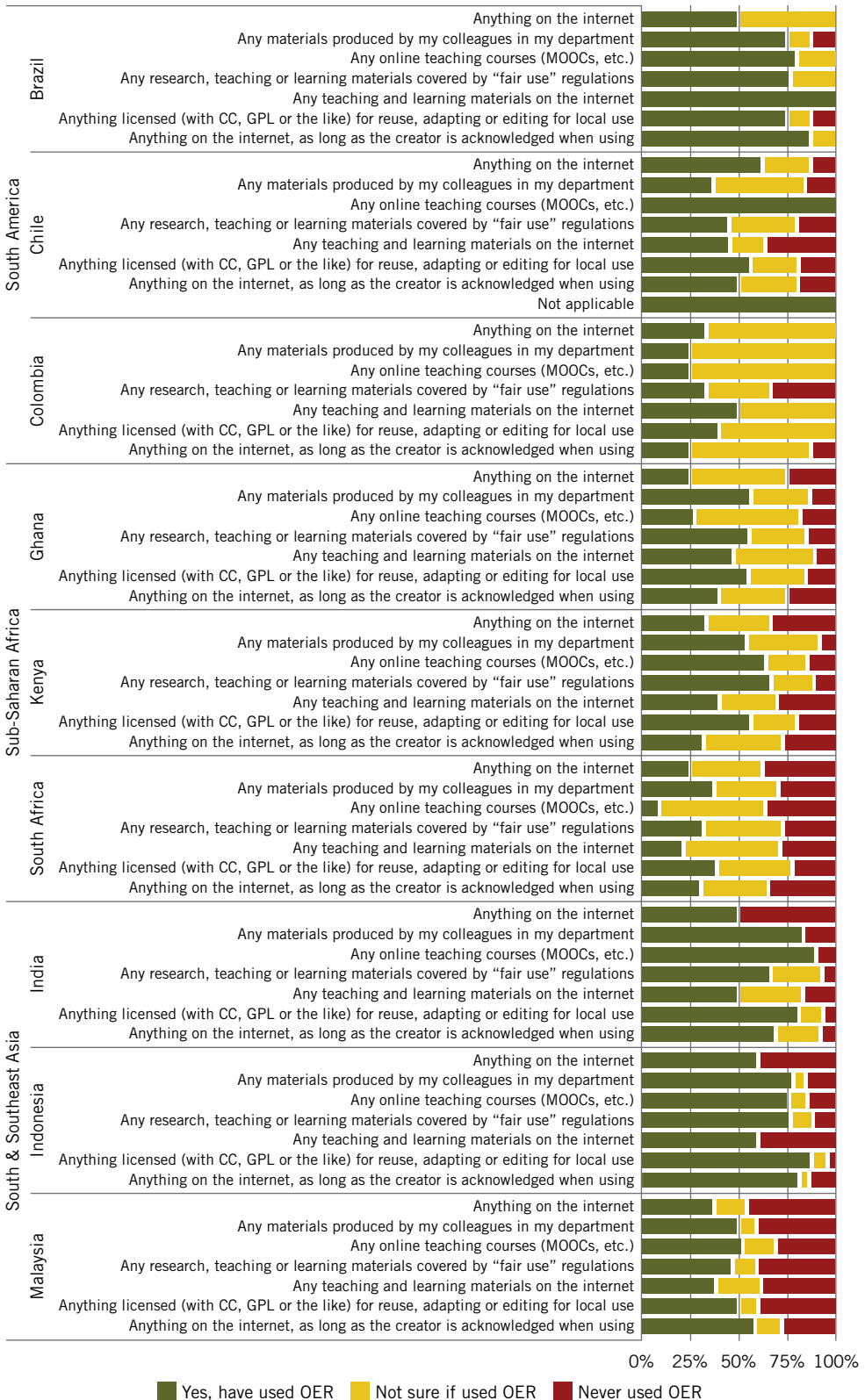
Figure 16: **Instructor OER use by response to prompt "Materials you feel free to use for teaching" per country**

Willingness to use OER again

An associated assumption tested is that the prior use of OER positively influences whether respondents feel interested in using them again in the future (Lee et al., 2009).

Figure 17 shows OER users' (n = 150) responses to the statement "I am willing to participate in other OER opportunities", distinguished by country and region.
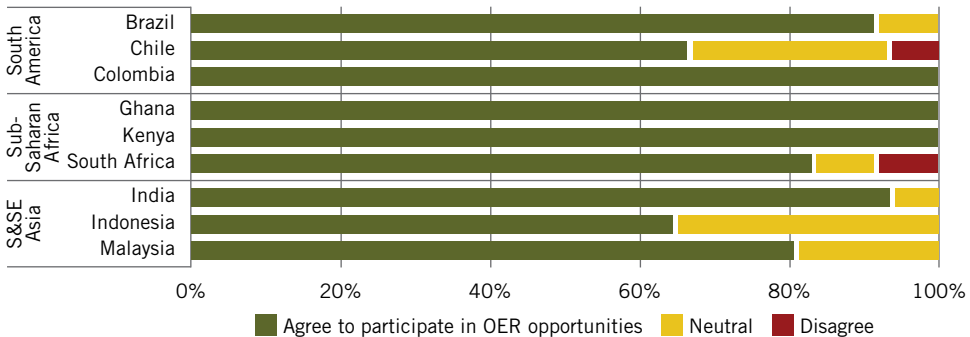

Figure 17: **OER-using instructors' willingness to participate in OER opportunities again**

This question was designed to discover whether those who had already used OER were interested in doing so again. As Figure 17 shows, the vast majority of respondents said that they were willing to do so. This is not the same as stating that they planned to use OER in the future, just that they were open to the possibility. It appears that their experiences with OER in the past were positive enough for them to remain willing to engage with OER again. Only a small percentage of respondents from Chile and South Africa (each less than 10%) said that they would not be willing to do so.

Thus, the assumption is sustained, as the data suggest that prior OER use by instructors is associated positively with their willingness to use OER in the future.

Open licensing

The final set of variables surveyed pertained to instructors' experience with applying open licences to their educational materials.

The assumption is that instructors' familiarity with and use of particular types of licences to share their teaching materials – primarily open licences, such as CC – will influence the likelihood of their using OER (McGreal et al., 2013).

Figure 18 shows the number of respondents who said that they used a licence to share their own teaching materials, distinguished by country and region.

The figure shows that in seven of the nine countries – including all sites in South America – the majority of instructors stated that they had never applied any type of licence to their teaching materials for sharing purposes. This suggests that they either have typically not shared their teaching materials with other instructors or, if they have done so, they have done it informally, perhaps with colleagues in their own departments.

This question illuminates the comparative rarity of instructors formally sharing teaching materials under legal open licensing provisions in the Global South. While 23% of instructors have shared their materials with a CC licence, GNU GPL licence or "other open content

licences" (n = 67),[3] the majority (77%) revealed that they had either not applied any open licence to their materials (n = 228), meaning that they had not applied any type of licence to their materials (n = 162), or that they retained full copyright on their work, implying that the materials were not open (n = 66).[4]
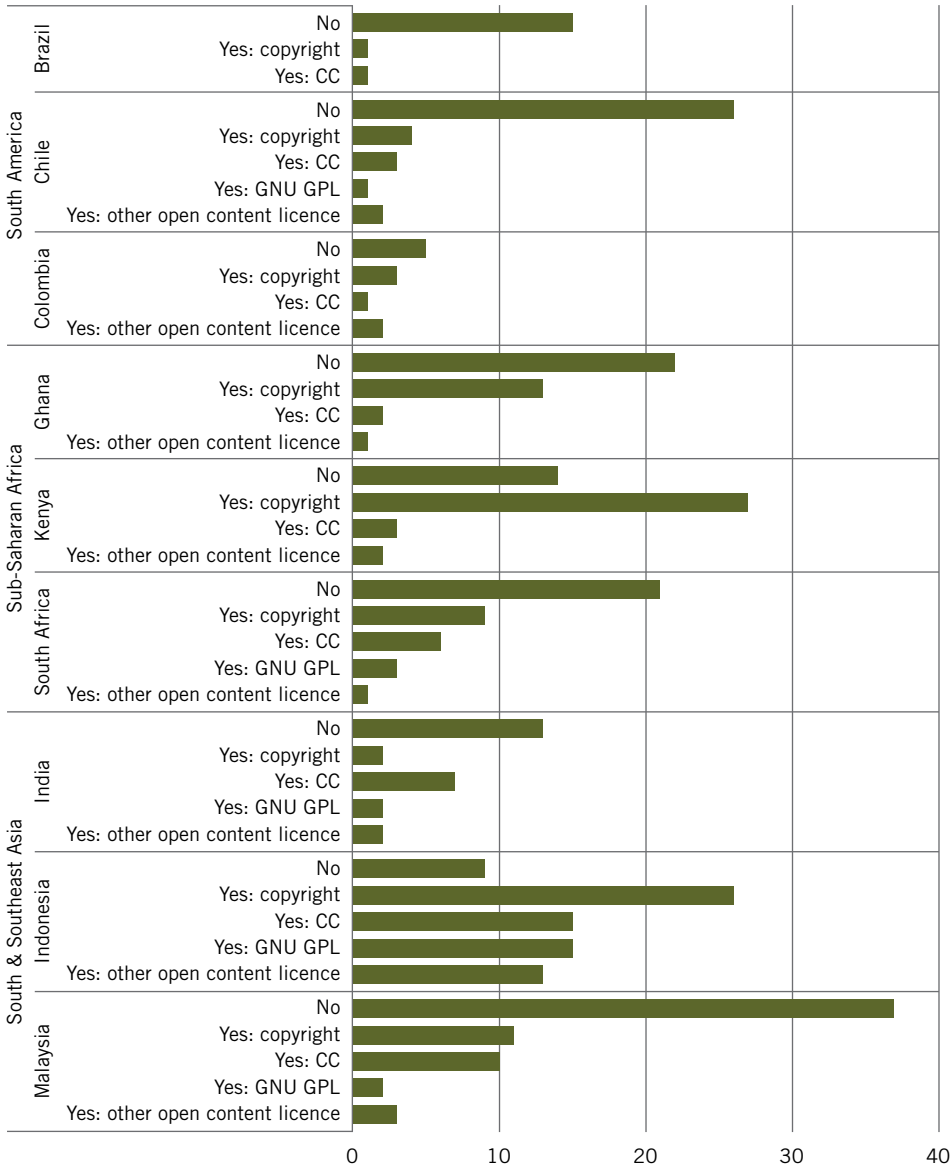

Figure 18: Instructors' use of licences (raw numbers)

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3   There are 97 instances of open licensing noted in Figure 18, the result of 67 respondents answering yes to multiple open licence fields.

4   There are 96 instances of copyright licensing noted in Figure 18, though 30 of these responses were from respondents who had licensed some of their other materials with an open licence (thus we counted them in the "OER creator" numbers). Thus the tally of respondents who have only used copyright, and none of the open licences, is 66.

These data demonstrate that more respondents say that they have *used* OER (n = 150, Table 3) than have *created* OER (n = 67), which is precisely what would be expected given the relatively low barriers to OER use compared to OER creation. While it is comparatively simple to source and use OER for educational purposes, it takes greater technical and legal knowledge to share one's work as OER.

Thus, OER use is likely to be more prominent than OER creation in virtually all contexts. Does this pattern of licensing activity suggest anything about respondents' OER use patterns? Figure 19 shows instructors' OER use rates according to their previous experience with copyright licensing.
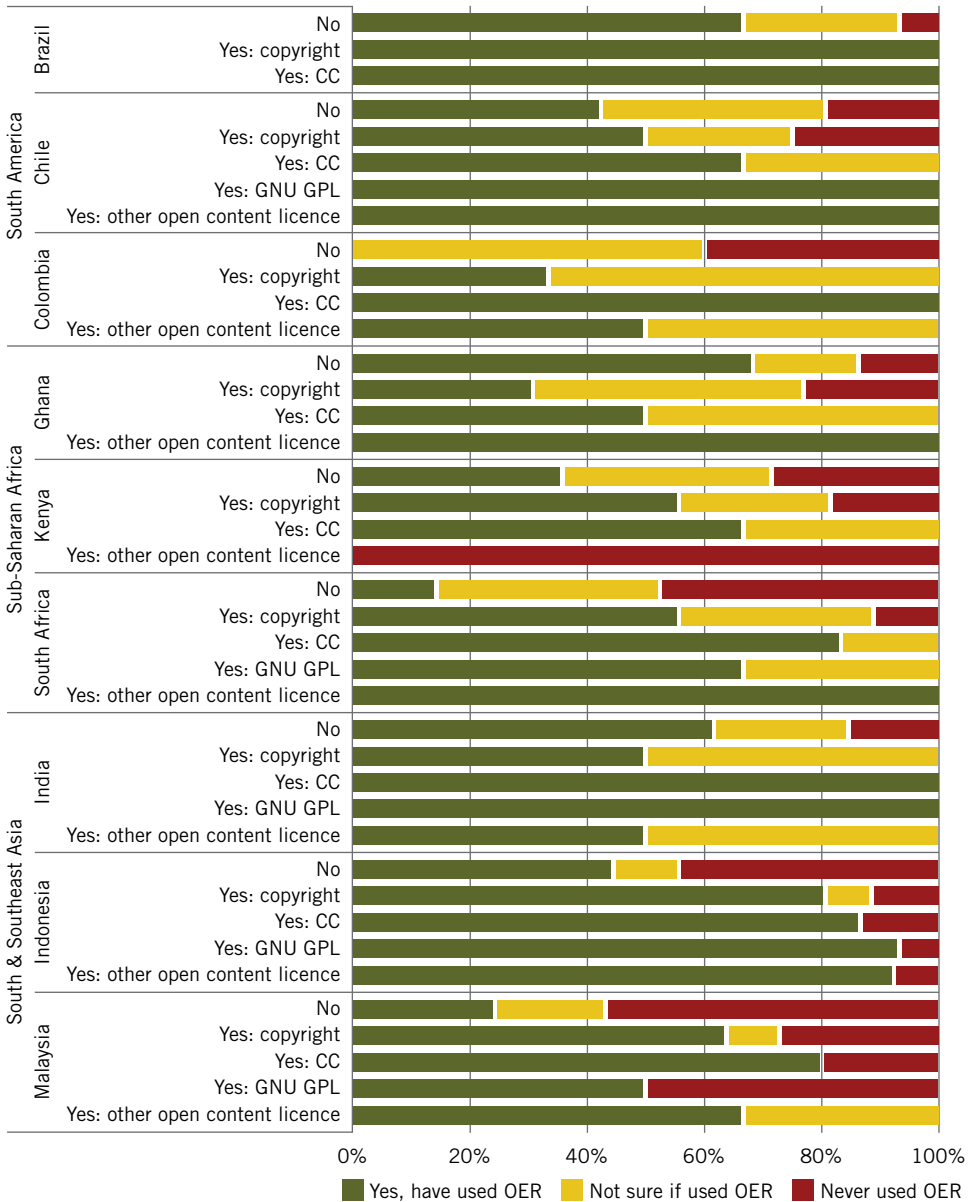

Figure 19: Instructor OER use by previous experience with copyright licences per country

These data suggest that those who have shared their materials openly are more likely to have also used OER than those who have not shared their materials openly. Thus, the assumption stands as there is a positive association between open licensing practices and OER use.

Discussion

In this section, we discuss the meaning of the findings as they relate to the research questions driving this study:

1. What proportion of instructors in the Global South has used OER?
2. Which variables may account for different OER usage rates among respondents in the Global South?

OER use rates

The key survey question used to answer this study's first research question was, "Have you ever used OER that are available in the public domain or has an open licence (e.g. Creative Commons) that allows it to be used and/or adapted by others?" The possible responses were: yes, not sure or no.

The survey data reveal that 51% of instructor respondents have used OER (Table 3). This is a small majority of respondents, and may in fact understate the use rate because 24% of respondents were "not sure" if they had ever used OER. Some may have done so without knowing. However, for the purposes of this study, we will stay with the 51% OER use rate. This is a baseline number that is useful for comparison purposes in other studies, and one that is slightly differentiated between the three regions, with use rates slightly lower in South America (49%) and Sub-Saharan Africa (46%), and a little higher in South and Southeast Asia (56%).

Because this is the first study to attempt to determine the OER use rate for higher education instructors across (and solely in) the Global South, it is impossible to determine whether the slim majority of users represents a high or low use rate. As noted, other potentially comparable surveys (COL, 2016) include respondents outside of higher education, outside of the Global South or who may not have been recruited through a random sampling methodology, as was the case in this study.

What these numbers do show, however, is that there is plenty of room for greater OER engagement. It is anticipated that OER use rates will gradually increase over time, but probably not to the extent that the practice becomes ubiquitous. Just as there are many reasons to consider using OER, instructors may also feel that there are reasons to avoid using them, especially if the OER content that they find is not of the requisite quality, relevance, level (undergraduate vs graduate), language or format they require. As more OER are shared openly by OER creators, there is a greater likelihood that some of these concerns will be allayed as the density and diversity of materials start to meet more instructors' needs.

Variables affecting OER use

The second question guiding this study sought to discover which variables might account for different OER usage rates between respondents in the Global South. In the Findings section, we looked at how a number of variables covered in the survey either influenced OER use or did not appear to do so. The survey attempted to identify variables relevant to instructors in the Global South in terms of influencing their OER choices, grouped under the following themes and discussed below: demographics, infrastructure, institutional environment, instructor attitudes and pedagogical practices.

Demographics

The survey results showed that a number of demographic variables influenced OER use. First of all, the country in which instructors worked and lived appeared to have a sizeable influence on OER use, but not in the way that was expected. While we assumed that OER use would be higher in countries that enjoyed greater economic development – as expressed by GDP per capita – we found that it was largely the opposite in that respondents in the lesser-developed countries of a particular region were more likely to be OER users than those in the more developed nations within that region. Thus, in Africa, Ghanaian and Kenyan instructors had a higher OER use rate than South Africans; in South and Southeast Asia, Indians and Indonesians had a higher use rate than Malaysians. (The low number of respondents from Brazil and Colombia makes the South American use rates more difficult to compare.)

While this trend from the data does not prove that OER use rates are universally associated with lower economic development, it suggests that OER may be more useful for instructors in countries that lack certain resources compared to instructors in more developed countries, precisely because it overcomes some of the challenges associated with lower economic development, such as lower access to quality teaching materials that are affordable and flexible. This does not mean that we would therefore expect to find the highest rates of OER use in a country such as Somalia (which has the lowest GDP per capita in the world), but it may suggest that, *above a certain level of economic development*, it might be the instructors from the countries that arguably "need" OER the most that actually use them the most. OER may be more of an optional luxury in more developed countries, and are thus treated as such, while in less developed countries they may be treated as crucial "free" resources in resource-constrained environments.

Second, a similar logic applies to the association between instructors' digital proficiency and their use of OER. While we assumed that higher (self-declared) proficiency would translate into higher OER use, we found that while it was true that those who rated their proficiency as "basic" had the lowest OER use rates, those with "advanced" proficiency did not have the highest. It was those in the "intermediate" category who had the highest. Thus, it appears that, regarding OER use, once instructors reach *a certain level of digital proficiency* – somewhere between basic and intermediate – they have the necessary technical skills to engage with OER. Below that level, their lack of skills is a barrier to OER use. However, once the appropriate level is reached, then further skills development does not lead to ever-greater OER use.

Third, the survey found a counter-intuitive relationship between instructors' highest level of educational qualification and OER use. While we had assumed that OER use rates would increase relative to educational qualification – following the logic of the exposure effect – the results showed an opposite trend. Instructors with PhDs were less likely to use OER than those with lower qualifications. This may be due to the possibility that PhD holders are more confident in their own ideas and thus more likely to develop their own teaching materials from scratch, thereby not engaging with OER. Or they may feel that OER do not have the requisite quality for the courses that they teach. By contrast, instructors with diplomas, bachelor's or master's degrees may have entered the profession with the express desire to teach (not research) and thus taken more time to acquaint themselves with the full array of teaching materials available for use. They may also not feel that they are expert enough in their field to create educational materials from scratch and thus rely on external OER for support. Whatever the reasons, it appears that OER fulfil a useful role for instructors without PhDs.

Lastly, there was a curious, albeit mild, association between instructors' positions at their HEIs and their OER use. While there was no association based on hierarchical ranking – from junior to mid-level to senior positions – there was a greater likelihood of OER use if respondents said that they were administrators or managers. These respondents were all instructors as well, but they also noted that they played administrative or managerial roles – a fact that appeared to boost their rate of OER use. This may be due to the fact that these roles create an incentive for them to be aware of the variety of pedagogical innovations available, so as to provide better stewardship or leadership to fellow instructors. Further research is required to probe this relationship, but it appears that OER is an innovation that HEI administrators and managers are likely to be familiar with in the Global South.

The above variables were the only ones in the demographic category to show some sort of association with OER use. The many other variables did not. For example, we found no discernible pattern in the relationship between gender and OER use. The same was true regarding instructors' years of teaching experience and their teaching areas. While these variables influence a variety of aspects of instructors' lives, the survey data did not show that they affected OER use.

Thus, for instructors, demographic variables do not appear to determine OER use, though some variables seem to influence it. Part of the reason for this is that OER use requires a certain minimum threshold of access to ICT infrastructure, which the HEIs we surveyed provide. Beyond that key infrastructural factor, demographic variables would appear to play only a mild role in shaping OER use by instructors.

ICT infrastructure

The preceding insights help clarify the otherwise surprising result that suggests that infrastructure variables – location of internet access, device/s used to access internet, and the cost, speed and stability of internet provision – do not have a determining influence on OER use. Though many areas in the Global South face ICT challenges, the data provided by the survey respondents (all of whom worked in HEIs) did not suggest that ICT infrastructure influenced their personal level of OER use. The reason for this is that they worked or studied in contexts that provided at least the minimum level of ICT access for them to engage with

OER. Once that condition was met, infrastructure issues no longer acted as a defining set of variables for OER use.

This outcome is a surprise because the concern about ICT infrastructure and access is prevalent in studies about education in the Global South (Teixeira et al., 2012). However, it appears that most HEIs in the Global South – or at least the ones surveyed in this study – are able to meet the minimum level of access required for instructors to engage with OER, making it less of an issue with regards to OER use. This is heartening for OER proponents, as it allows them to focus their advocacy on less intractable or large-scale challenges than ICT infrastructure (which entails heavy costs) in higher education settings. It also suggests that once a country or HEI is able to achieve a certain standard of ICT provision, OER use rates should not be determined by infrastructure concerns, but by other variables.

Institutional environment

The institutional environment – the place where instructors teach, access the internet and interact with colleagues – has a crucial influence on educational practices, including engaging with OER. For most instructors, it provides the necessary infrastructure and opportunity for using OER. Another key variable within that environment is whether the institution has policies that support the use of OER. In the survey, respondents were asked to say whether they believed that their institutions had policies that were supportive of OER (thus making the question subjective to an extent). Our assumption was that those who worked in more "pro-OER" environments would also be more likely to have used OER.

However, that was not the case. There was no discernible association between respondents' perceptions of their institutions' OER-related policies and their use of OER. Indeed, respondents from the same institutions often had differing perceptions of their policy environment, thus making it difficult to know for certain whether the policies were indeed pro-OER, or what element of those policies was deemed to be pro-OER.

While we continue to assume that policy remains a crucial variable in OER engagement – more on the OER creation side, however, than in OER use – this survey did not establish a relationship between policy perception and use rates as the data were inconclusive.

Attitudes

Beyond institutional variables, there are also broader national policies and pedagogical norms that appear to influence instructor decisions regarding OER. This is evident in the responses to the question in the survey concerning which materials instructors feel free to use in their teaching. Many feel free to use anything on the internet regardless of legal licence, which negatively related to OER use. Since they felt this way, they did not treat OER as a special or better type of educational content. It was not the key consideration in how they made pedagogical decisions. This agnosticism towards OER was also shown by respondents who declared that they felt they could use anything as long as it conformed to "fair use" provisions – a broad, vague category of activity. The fact that instructors feel covered by fair use in their "borrowing" of materials for teaching suggests that they do not feel restricted to search only for materials that are explicitly licensed for open use.

However, those who stated that they were comfortable using "anything licensed openly" (especially in Colombia, Ghana, South Africa and Indonesia) and who understood the legal implications of open licensing, were also more likely to use materials that were specifically

licensed as such. This implies that there is an association between respondents' open ethic and OER use. When instructors agree with the principles of the Open movement, they are more likely to also use the products of that movement, such as OER. This should not be a surprise, but it reveals the central role that personal attitudes and values play in pedagogical decision-making.

For the 51% of instructors who said that they had used OER, more than 90% said that they would be willing to use OER again. This suggests that instructors' experiences with OER were positive enough to allow them to imagine future use opportunities. This is a highly positive result for OER as a category of educational materials, suggesting that such use will spur further engagement with it.

Pedagogical practices

Lastly, the survey attempted to ascertain whether there was an association between OER use and whether instructors had ever created OER themselves. When asked whether they had ever applied any type of licence to their teaching materials, those who said that they had applied a CC, GNU GPL or other form of open licence to their work were much more likely to have used OER than others who had never applied such licences to their work or who had retained full copyright restrictions on their work.

This suggests that OER creation is associated with OER use (though not necessarily the other way around). The level of awareness around OER is often quite high for an OER creator as it requires a level of legal and technical knowledge that is greater than for OER use. That is why the rate for OER creation was lower than for OER use.

Conclusion

The key insight from this research is that, for our survey respondents in the Global South, OER use is predicated upon instructors enjoying a certain minimum level of access to ICT infrastructure – especially hardware (computers, mobile devices, etc.) and internet connectivity (broadband, Wi-Fi, etc.) – which, once achieved, can only be described as an enabling factor for OER engagement, but not a motivating factor. Beyond that minimum, increased internet speeds, lower internet costs and greater diversity of technical devices do not lead to ever-increasing OER use rates. Once the minimum is met, the infrastructure issues that are often seen as the defining contextual factors of the Global South, no longer have much influence on OER usage, as other variables shape instructors' decisions around such practices. As has been demonstrated, in the higher education context focused on in this study, the minimum standard for ICT infrastructure was met for virtually all instructors working at HEIs, thus access issues were not key to whether they used OER or not.

Additionally, demographic variables played only a minor role in influencing respondents' OER use. The social or employment status of instructors did not appear to have much of an impact on usage rates. This is likely due to the fact that all of these instructors share similar educational missions; they possess a similarity of purpose that more profoundly shapes their OER use than does their gender, age, position and so forth. Thus, just as respondents shared a certain standard of access to ICT infrastructure (thereby decreasing it as a differentiating variable between them for OER use), they also shared a common educational

interest which, for the most part, made their personal, identity-related characteristics less important for influencing whether or not they would use OER.

Similarly, while policy would likely be a crucial factor in OER creation, it did not seem to be important regarding OER use. This appears to be due to the conventions and traditions around teaching materials development, where notions of "fair use" remain prevalent, meaning that instructors feel relatively free to include what they like in their materials as long as it conforms to the needs of the curriculum. Whether those inclusions are OER or not would have less to do with the institutions' policies on OER per se, and more on their policies regarding copyrighted materials, which may be either borrowed under "fair use" principles or paid for through a licensing agreement with the publisher. Thus, for OER *use*, policy did not appear to be a key differentiator for the respondents in the institutions surveyed.

Instructors' national economic development contexts do, however, appear to have played an important role in determining OER use trends. In contrast to the assumption that higher economic development (as expressed in GDP per capita figures) would be associated with higher OER use rates, the data suggest the opposite. Instructors in the comparatively less developed countries were using OER at a markedly higher rate than those from the more developed countries (at least intra-regionally). This suggests that instructors from the relatively lesser-developed countries may find greater utility in OER because they serve to overcome some of the educational challenges associated with their national contexts' lower economic development, such as less funding for expensive copyrighted teaching materials, less student capacity to buy textbooks and fewer materials emanating from a local publishing industry. Such instructors may feel structurally compelled to seek out viable solutions to these challenges through free OER. This is a tentative conclusion requiring further research, but it opens up interesting questions about how OER are being used, and by whom.

With this in mind, it appears that the two key motivating factors of OER use (though not creation) in the Global South revolve around the national economic context in which instructors and their students live, and the ethics and values that instructors have in approaching their pedagogical practices. In essence, the national development aspect acts as a broad structural motivator, encouraging instructors to seek out alternatives to the expensive textbook and teaching materials market. That, in turn, helps shape individual instructors' beliefs about good educational practice, encouraging them to explore OER as one type of innovation in the field that may answer their particular needs. The fact that more than 90% of respondents who had used OER in the past said that they would be open to using them again suggests that these materials had some utility for them, and indeed coincided with their values.

Acknowledgements

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