

Hearing Pacific Island Voices: Digital Divide in Guam's Public Schools

Richard Carlos L. Velasco

Abstract

Discussions and studies regarding the pervasive digital divide in the Pacific Islands are scarce, with those available particularly focusing on insular areas considered to be part of the developing world. To date, there are no published articles addressing digital divides that are present on the United States territory of Guam specifically, as studies tend to clump the Pacific island together with the US mainland. Results taken from the online national survey, Speak Up, indicate that there is indeed a digital divide that exists within Guam's public schools. Results also indicate a gap between Guam's public schools and US mainland schools in terms of access to and usage of digital technologies. Guam's policy makers and school district leaders should consider these results to aid in the decision-making process when trying to prepare the island's students for a 21st century world.

Introduction

Since the introduction of the personal computer and the Internet, advances in information and communication technology (ICT) have revolutionized the world people live in today (Cruz-Jesus et al., 2015). However, many individuals consider these advances to be double-edged swords. While on the one hand ICTs seem to be beneficial for society, many on the other hand argue that such technologies actually promote an unintended societal separation. The latter scenario is known today as the *digital divide*, where a seemingly inevitable gap is placed between the 'haves' and the 'have-nots' (Iding and Skouge, 2005; Mamtora, 2001; Rapposa, 2016). The definition for digital divide has evolved over the years,

with research revealing that this particular phenomenon has become multifaceted in nature as more specific digital divides are present at various levels (Losh, 2003; Norris, 2001; Robinson, DiMaggio, and Hargittai, 2003; Van Dijk and Hacker, 2003). These studies and many others continue to add to the digital divide discourse that has been an ongoing discussion for over a decade (Banister and Reinhart, 2011).

In this paper, I provide evidence of the digital divide prevalent within public schools in the US Territory of Guam. I first discuss the problem at hand. There is a dearth of research regarding the presence of a digital divide on Guam. Then, I provide some background on Guam and specific policies from Guam's Department of Education (GDOE) concerning the use of educational technologies in the island's public schools. I then review current literature vis-à-vis contextual studies of the topic at hand, framing my research around concepts that contribute to the idea of a digital divide. Later, I present data taken from a national online survey collected by the GDOE and reveal findings from the results of the survey. Finally, I conclude with suggestions on how the digital divide may be bridged, and offer some ideas for further research.

Statement of the Problem

Unfortunately, discussions and studies regarding the pervasive digital divide in Pacific islands are scarce (Spennemann, 2004), with those available particularly focusing on insular areas considered to be part of the developing world (Cyrus, 2008; Speidel et al., 2015). To date, there is no published article addressing digital divide on the US territory of Guam. Studies tend to clump the island together with the mainland (Spennemann, 2004). This is problematic, as blanket research statements regarding the digital divide in the US may not be accurate regarding the contextual situation on Guam. Furthermore, solutions provided to bridge the digital divide in the continental United States may not be applicable for the Pacific Island territory that is geographically separated by a vast body of water. As a result, I make the following arguments: (1) there indeed exists such a phenomenon on Guam, focusing mainly on the digital divide present within Guam's public schools; (2) although current research and studies batch Guam together with the US, there still exists a digital divide between schools in Guam and schools in the mainland; and (3) differences in geographical location, politics, and culture call for more specified solutions to close the gap made by the digital divide.

Research Questions

This study contributes to the current literature concerning digital divides and provides additional findings to the scant research regarding technology and education in the islands of the Pacific and, more specifically, the Pacific region of Micronesia. This paper will address the following research questions:

1. What digital divides exist within Guam's public schools?
2. What digital divides exist between Guam's public schools and US schools?
3. What solutions are necessary to bridge the digital divide within Guam's public schools and between Guam's public schools and schools in the US mainland?

Background

Geographically, the kidney-shaped island of Guam is considered to be a part of the Micronesia land area region located in the northern Pacific Ocean, about three-quarters of the way from the US state of Hawaii to the Philippines. With a population of about 170,000 people, Guam is about three times the size of Washington D.C., covering a land area of 544 square kilometers. It is also the largest and southern most island of the Mariana Islands archipelago (CIA, 2017). Guam experiences a generally warm and humid tropical marine climate, moderated by northeast trade winds. There is very little seasonal temperature variation, with the island only experiencing what is locally known as 'rainy' and 'dry' seasons. The dry season typically runs from January to June, while the rainy season runs from July to December. The rainy season also brings frequent squalls, and at times, relatively rare but potentially destructive typhoons (CIA, 2017). Generally, if a typhoon does make landfall on the island, local businesses and public schools are closed for business indefinitely, until damages to infrastructure have been repaired for safe and continued operation. Typhoons and general infrastructure issues play a major factor in the digital divide present on Guam as resulting damages infringe on students' continued access to information to support them in school.

Politically, Guam is a self-governing, unincorporated territory of the United States with policy relations between Guam and the US under the jurisdiction of the Office of Insular Affairs, US Department of the Interior. The island was turned over to the US from Spain in 1898 (CIA, 2017). Residents of the island are unable to vote for the US president; the highest-ranking executive officer of the island is the governor. How-

ever, Guam is able to elect, by majority vote, a delegate who serves as a voice of the island to the US House of Representatives. Guam is also diverse in that the indigenous people of Guam comprise about 45 per cent of the population, 20 per cent are Filipinos, and the remaining 35 per cent comprises people from various Asian countries and other neighboring Pacific Islands such as Chuuk, Yap, and Palau. Immigrants from the latter demographic group have increased over the years as residents from the neighboring islands are able, under US government law, to freely migrate to the US and obtain employment (US Government and Federated States of Micronesia, 2003).

Policies on Educational Technology on Guam

Just like much of the nation, Guam has also seen an increase in the use of educational technology in public school classrooms, especially with the growth of ICTs and the availability of mobile devices. Because of this, GDOE was prompted to develop and revise board policies to help regulate the use of digital technologies, the Internet, and mobile devices in the classroom. GDOE's board policies are considered open access documents and are available for the public to view on the district website (Guam Education Board, 2017). The board policies I will briefly describe are (1) Board Policy (BP) 406, which is GDOE's board policy on cell-phone use in the district's schools; (2) BP 473, which describes GDOE's compliance with the nation's Internet safety policy; and (3) BP 379, which is GDOE's extensive educational technology use policy document.

GDOE's BP 406 allows the use of cell phones in classrooms, granted that they are used for educational purposes. They may also be used as a form of assistive technology if a student has an IEP (Individualized Education Plan, an IHP (Individualized Health Plan), or a 504 plan (GDOE, 2012). Outside of the classroom, GDOE students are able to use their cellphones for emergency purposes such as contacting a parent with the permission of an adult school personnel.

GDOE's BP 473 is in compliance with the nation's *Children's Internet Protection Act* (CIPA) and regulations of the Federal Communications Commission (FCC), which serves to enforce Internet safety protocols via the use of Internet protection measures (GDOE, 2014a). This board policy addresses the use of filtering and blocking applications to prevent access to inappropriate material over the Internet in GDOE schools. Moreover, supervision measures are provided for educators to ensure the presence of educational personnel while students are accessing the Internet over GDOE's network connection. Also in compliance with

CIPA and FCC, as per board policy, GDOE is required to provide students with instruction in appropriate online behavior, social networking, and concepts of cyber bullying (GDOE, 2014a).

Finally, GDOE's BP 379 is a ten-page document that deals with the use of educational technology in GDOE public schools. It includes established rules and regulations for all users (students and staff) accessing the GDOE network (GDOE, 2014b). The document mentions that this particular board policy will be included in the school handbook, which is typically distributed to parents, meaning that all stakeholders get to be aware of the policy. Guidelines provided with the board policy ensure that teachers educate students on the importance of digital technology safety, while promoting its purpose in lifelong learning. Furthermore, guidelines for appropriate use and conduct of digital communications via the Internet are also detailed, enforcing the idea that the use of the Internet should be for educational and research purposes (GDOE, 2014b).

BP 379 also provides points of unacceptable uses of GDOE technology. These points include transmitting of information that violates local or federal law, accessing inappropriate material such as pornographic or other malicious matters, and using any website or application program to bypass the department's filtering device. At the end of the document, brief guidelines are provided for appropriate and inappropriate use of email accounts for all GDOE network users, inclusive of students and staff. Finally, user agreement forms are included in the appendix of the document for both students and parents to endorse and return to their respective schools (GDOE, 2014b).

Defining Digital Divide

The concept of a digital divide would not have existed without the introduction of ICTs. Research indicates that the origin of the actual term is fairly difficult to trace (Cruz-Jesus et al., 2015). Rapaport (2009) suggests that the term first originated from a report prepared by the National Telecommunications and Information Administration (NTIA) in the summer of 1995, which revealed findings regarding access, or the lack thereof, to digital technologies in rural and urban America. Since then, the definition of the digital divide has undergone major transformations in terms of what it is attempting to describe.

'Digital divide' initially referred to access to technological hardware or the Internet in what research usually refers to as the *haves* and *have-nots* (Cullen, 2001; Iding and Skouge, 2005; Mamtora, 2001; Van Dijk, 2006). The *haves* are citizens who have access to physical technol-

ogy hardware and/or the Internet, while the *have-nots* are those who obviously do not, referring mainly to differences in socioeconomic statuses or between other demographic groups (e.g. gender, race, educational level). However, other studies have claimed that defining the digital divide as a separation between two groups in terms of mere access is insufficient (Epstein, Nisbet, and Gillespie, 2011; Mo et al., 2013; Waycott et al., 2010). In other words, the mere presence of a personal computer or the Internet does not necessarily mean that the owner is making use of its intended purposes or that it would bring about social change, a concept termed by researchers as 'technology determinism' (Van Dijk, 2017; Warschauer, 2003).

Thus, in addition to access, digital divides have been defined to be inclusive of actual usage of the technology hardware and the Internet (Cruz-Jesus et al., 2015; Van Deursen, Van Dijk, and Ten Klooster, 2014). This, in turn, eventually led to a more narrowed definition in that digital divides include availability of broadband connection capabilities and specific types of online uses (Dewan and Riggins, 2005; DiMaggio et al., 2004; Radovanović, Hogan, and Lalić, 2015). Essentially, the evolution of 'digital divide' involved a shift from ownership of the physical hardware connectivity to also possessing the necessary ICT skills (Antonio and Tuffley, 2014; Ritzhaupt et al., 2013).

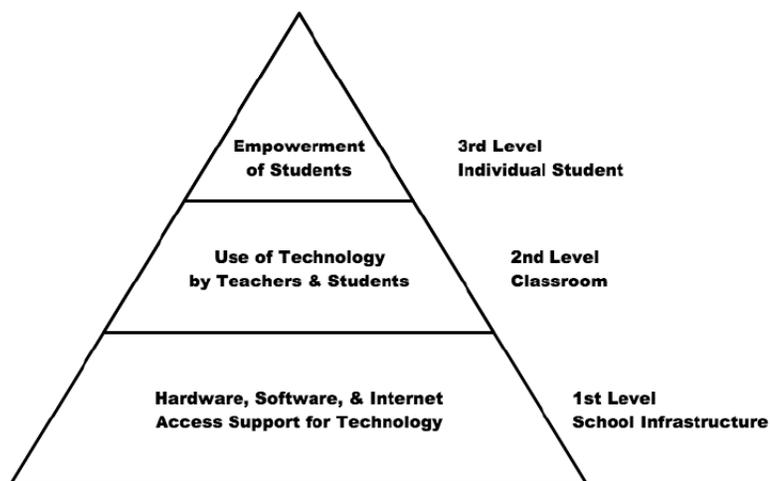
Conceptual Framework

I draw upon the concept of a digital divide with three different levels within schools as outlined by Hohlfeld et al. (2008) to frame my study. The framework by Hohlfeld et al. (2008) is best visualized when imagining a triangle consisting of three levels (see Figure 1). The first level of framework recognizes a digital divide within the school's infrastructure, referring mainly to access to hardware, software, the Internet, and technology support. Visually, this level of the framework is placed at the bottom or base of the triangle, encompassing the largest area of the frame. This is done purposefully as the larger area signifies that a substantial amount of research about digital divide within schools relate to access to such technologies (Ritzhaupt et al., 2013).

The second level of the framework is the prevalence of a digital divide at the classroom level (Hohlfeld et al., 2008). Placed in the middle as the second layer of the triangle, this level refers to the frequency of the students' and teacher's use of technology and the purposes of the use. Once again, placement of the level in the visual model of the triangle is intentional as the first level of the digital divide needs to be in place in

order for the second level to even exist. In other words, differences in technology usage would not be visible if access to the technology is non-existent to begin with (Ritzhaupt et al., 2013).

Fig 1: Levels of Digital Divide in Schools



(Source: Hohlfeld, et. al, 2008)

Finally, the third and final level of the framework sits on the top layer or the peak of the triangle. This level of the digital divide model is concerned about the student as an individual user of digital technologies (Hohlfeld et al., 2008). More specifically, this level is concerned with whether or not the student knows how to use ICT technologies for her personal empowerment. A study by Ritzhaupt et al. (2013) suggests that this is perhaps the most difficult digital divide to recognize within school systems, which is an indicator of why not much research has been conducted at this level.

The current study aims to add to the literature regarding digital divides at the student empowerment level in Guam's public schools.

Method

Not many studies have been done on digital divides on the island of Guam. However, in recent years, GDOE has been participating in the 'Speak Up' project which provides the district with very robust data re-

garding access and use of technology by stakeholders in the educational community. According to their website, *Speak Up* is an initiative of *Project Tomorrow*, a leading global education non-profit organization (Project Tomorrow, 2017). Items in the survey include questions about the use of technology, 21st century skills, and emerging technologies such as online learning and mobile devices. Every year since 2003, Project Tomorrow polls education stakeholders regarding digital technologies in schools, with the hope that data collected may help in the decision-making process to prepare schools for the 21st century. For instance, in the most recent press release of the overall results of the *Speak Up* survey, a key finding reveals that two-thirds of parents from all types of communities (urban, rural, and suburban) believe that the effective use of technology within the classroom provides a significant way for their child to develop college and career ready skills (Fullan, 2017).

At the end of the polling timeframe, data for participating districts are collected and organized in a spreadsheet to be disseminated back to respective district personnel. For the purposes of this study, I obtained the results of GDOE's participation in the initiative from GDOE personnel. Specifically, I will present results polled from students at the primary, middle, and high school levels. These results will be compared to results taken at the national level. Because of the volume of the survey questions, this study will focus only on survey items that align with the study's conceptual framework. Wording of the survey items varied between different group participants, as different grade and reading levels were taken into account. Nonetheless, items used for this study were closely related to the themes of the framework. These include items that recognized access to hardware, software, the Internet; amount of usage of these technologies; and purposes for using these technologies.

Findings

A smaller-scale, local survey was also disseminated to education stakeholders in Guam. Results show that access and use of technology in education was a top concern among parents and students in GDOE schools (Basa, 2017). Presenting results from the *Speak Up* survey would help magnify these local results in hopes of closing the gap created by the digital divide. Furthermore, the intent of the current study was not to conduct any inferential analyses with the data; rather, the intent was to provide a platform for local student voices to be heard regarding the perceptions of implementing technology in education on the island. The following sections present findings from the *Speak Up* survey taken from

GDOE students in the primary, middle, and high school levels.

Grade 3-5 Students

One of the questions in the survey for third-through fifth-graders was, 'Which of these mobile devices do you have for your own use?' Choices in the survey include phone without internet, phone with internet, laptop, and tablet; students could own more than one device. GDOE results indicate that 51 per cent of this grade level group responded that they owned a phone with Internet capabilities, 47 per cent owned a tablet, and 29 per cent owned a laptop. Comparatively, overall national results indicate that a slightly smaller percentage (47 per cent) of grade 3-5 students owned a phone with Internet capabilities. However, 59 per cent of the nation's grade 3-5 students owned a tablet and 39 per cent own a laptop. These are wide differences considering Guam's small population.

Another interesting statistic in terms of usage, however, is the fact that 61 per cent of GDOE students at this grade level responded to using school-provided laptops as compared to 30 per cent of overall students in the US. Furthermore, 14 per cent of grade 3-5 students on Guam used technology in school daily for their learning as compared to 40 per cent of the students in the US. This is understandable as 32 per cent of students responded that they were unable to use the Internet everywhere in school, 50 per cent responded that Internet speed in schools was too slow, and 30 per cent indicated that they were not allowed to use their mobile devices at school.

In terms of student empowerment, 42 per cent of GDOE grade 3-5 students use the Internet to search for items to help them with their homework. This is comparable to the overall national statistic of 40 per cent, as well. However, at the national level, 48 per cent of grade 3-5 students play digital learning games as compared to 37 per cent for GDOE. These statistics are quite interesting, especially since 56 per cent of GDOE grade 3-5 students responded that they want to have a future job that involves science, math, and computers, as compared to the nation's 45 per cent. Also, 80 per cent of the respondents liked to do work that involved some sort of programming, as compared to the nation's 61 per cent.

Middle Grades

At the middle school level, the digital divide between Guam public schools as compared to US mainland schools are more apparent. Sixty

percent of GDOE middle school students responded to owning a smart phone, as compared to the nation's 77 per cent. Also, 35 per cent of GDOE middle school students owned a personal laptop, compared to the nation's 50 per cent. Furthermore, 43 per cent of GDOE middle school students used computer labs to help them with their schoolwork and only 9 per cent were provided laptops in schools, as compared to the nation's 44 per cent.

Responses also indicated that more middle school students used technology for their schoolwork than primary school students. Thirty per cent of GDOE middle school students responded that they used technology daily, and 24 per cent used technology more than once a week. However, GDOE middle school students shared the same perceptions as the primary school students. Thirty-nine per cent responded that the Internet in GDOE public schools was too slow or inconsistent, 26 per cent responded that the Internet was not accessible school wide, and 27 per cent responded that there were too many rules regarding technology usage in schools.

In terms of academic empowerment, 93 per cent of GDOE middle school students thought that it is important or very important that mobile devices should be used to help support them in their schoolwork. Furthermore, 53 per cent believed that playing digital games would keep them more engaged, and 43 per cent considered school more interesting if more technology were incorporated in their learning. Meanwhile, nearly half (47 per cent) of GDOE middle school students stated that they rarely used the Internet for general news or current events. Most students responded to using social media for personal purposes. A smaller proportion (32 per cent) showed interest in pursuing a career in STEM (science, technology, engineering, mathematics).

High School Level

At the high school level, 71 per cent of GDOE students claimed to own a smartphone with internet capabilities. This is low compared to the 90 per cent respondents at the national level. The gap between laptop ownership is fairly similar, with 45 per cent of GDOE high school students responding that they had access to one, as compared to the nation's 56 per cent. In schools, access to personal mobile devices seemed to be more allowable as 68 per cent of GDOE high school students responded that they used such devices to help them with their schoolwork. However, only 3 per cent responded that they were provided with school-owned Chromebooks (laptops), as compared to the nation's 32 per cent.

Thirty-nine percent of GDOE high school students used internet and technology daily to do work for school, while 30 per cent responded that they used these technologies a few times a week. Comparatively, results from the US indicated that 48 per cent of students used these technologies daily, while 26 per cent used them a few times a week. Again, the gap seems to widen as the students increase in grade levels. Fifty-five percent of GDOE high school students stated that internet in schools was too slow or inconsistent, while 50 per cent indicated that Internet access was not school wide. This latter statistic contrasts that of the nation, as only 16 per cent of the nation's respondents indicated that Internet access was not school-wide. Also, perceptions of technology rules being too stringent were still fairly high—41 per cent for GDOE and 43 per cent for the nation.

For GDOE high school students, a high percentage responded to using mobile devices mainly for doing research for schoolwork (81 per cent) and for checking grades (79 per cent). More than half (52 per cent) of GDOE high school students preferred to receive information about their performances in class via email, but more than half (55 per cent) also responded to using their mobile devices mainly for social media entertainment such as YouTube. When asked about their interests in pursuing a career in STEM, 85 per cent of GDOE high school students responded that they were somewhat or very interested in this. Also, 78 per cent responded to being somewhat or very interested in taking programming classes.

Discussion and Implications

GDOE results from the *Speak Up* survey reveal very interesting findings and provide numerous implications regarding digital divide within Guam's public schools and between the island's schools and US mainland schools.

First, across all grade levels, GDOE students believed that the district's network connection speeds were too slow and inconsistent. This differs greatly from the US mainland's perspective of Internet provided in other districts in the nation. In order to keep up with changes in curriculum and to further prepare students with ICT skills, student access and usage of the internet during school hours may prove beneficial. Especially for Pacific Islander students whose culture reinforces other responsibilities at home (Spennemann, 2004; Ratliffe, 2010; Ratliffe et al., 2012), conducting research online at school may be the only viable option for them.

Secondly, although older students—more so than younger ones—owned more smartphones with internet capabilities, small percentages across all grade levels indicated that they owned a laptop. Furthermore, while it is indicative through the survey that many school districts in the nation are opting for mobile laptop carts and Chromebook usage in classrooms, schools in Guam are still mainly utilizing computer labs or other computer stations for their students to do work online. These findings do not necessarily indicate negative implications; however, district officials and school leaders on Guam may consider allocating funds for purchasing more mobile carts with accessible Chromebooks to use in every school. Perhaps an alternative may be to work in partnership with computer companies or the University of Guam to solicit older mobile devices to permanently use in public schools.

Finally, it is interesting to note that during the middle grades, percentages regarding interests in pursuing careers in STEM were much lower than during the elementary or high school levels. Moreover, uses of social media for personal entertainment reasons were much higher during this grade level, as well. This implies that more programs need to be set in place during the middle grades regarding appropriate uses of the internet in school as they perhaps begin to lose interest and are more tempted to place all their online attention to social networking sites. Middle school classroom teachers may use this to their advantage as they may incorporate appropriate social media sites in their lessons. As these programs are properly reinforced, students would feel more empowered to use digital technologies for their educational advantage by the time they students reach high school.

Limitations and Future Research

Several limitations need to be noted on the current study. First, digital divide encompasses other socio-demographic variables that were not taken into account for this study (Van Deursen et al., 2014). A more robust study would have been possible if data were segregated in terms of gender, family income levels, etc. However, data in the spreadsheet provided by GDOE via *Project Tomorrow* were kept at a generalized/aggregate level; deciphering individual responses was difficult and not plausible.

Another limitation was that the *Speak Up* survey was conducted using convenience sampling (Project Tomorrow, 2017). The results taken from the survey, thus, may not be an accurate account of the island as a whole. In the dataset provided by GDOE, responses only indicated

schools that actually participated in the survey. As taking the survey itself was not mandatory, some schools on the island were not included in the results. Also, different forms of response biases may have resulted in students taking the survey as many schools provided different incentives for students to complete their survey questionnaires on their own time.

Another limitation is the lack of inferential analyses of the study to determine if the results were statistically significant. The current study merely presents raw data of responses to the survey.

Because of lack of research regarding digital divides in Guam, various studies should still be conducted to add to the ongoing literature. One future study regarding digital divide in Guam's schools may consider looking more closely at differences in socioeconomic status' within the island. This study considered only Guam's public schools within the GDOE district. An examination of Guam's private schools on the same research platform as that for this study would be an interesting study.

Another research ideas may consider steps taken or likely in addressing the limitations indicated in this study. For instance, digital divides within Guam's public schools may be further delineated if other socio-demographic variables were taken into consideration, such as gaps between gender or different cultures present on the island or spatial dimensions. The presence of digital divides between Guam and the other Micronesia region islands also needs to be studied. Substantial findings may prompt these island community leaders to take action in working more collaboratively to bridge the gap of a possible digital divide.

Finally, it would also be beneficial to consider perceptions from other stakeholders who participated in the survey. If teachers and parents were also able to partake in the *Speak Up* survey, their perceptions of digital technologies in education would have revealed additional data for possible policy considerations. Including their perceptions would contribute to a better understanding of the digital divide; research suggests a disparity between digital citizens and digital immigrants who never grew up with such technologies (Waycott et al., 2010).

Conclusion

The current study provided some insights into the ongoing discussions of the seemingly inevitable digital divide that is prevalent in today's society. The US territory of Guam is definitely not immune to this phenomenon as results from the *Speak Up* survey indicate that a digital divide exists within Guam's public schools. Furthermore, results also indicated a gap between Guam' public schools and US mainland schools in

terms of access to and usage of digital technologies. Guam's policy makers and district leaders should consider these results to aid in the decision-making process when trying to prepare the island's students for a 21st century world. Now that Guam's student population has spoken, it is vital that their voices be heard.

References

- Antonio, A. and D. Tuffley (2014) 'The Gender Digital Divide in Developing Countries', *Future Internet*. 6: 673-687.
- Banister, S. and R. V. Reinhart (2011) 'TPCK for Impact: Classroom Teaching Practices that Promote Social Justice and Narrow the Digital Divide in an Urban Middle School', *Computers in the School*. 28: 1-22.
- Basa, I (2017) 'Technology in Schools among Top Concerns for Parents', *KUAM News*. [online] Available at: <http://www.kuam.com/story/35512033/2017/05/Wednesday/technology-in-schools-among-top-concerns-for-parents> [30 June 2017].
- Central Intelligence Agency (CIA) (2017) *The World Factbook*. [online] Available at: <https://www.cia.gov/library/publications/the-world-factbook/geos/gq.html> [2 Jul. 2017].
- Cruz-Jesus, F., M. R. Vicente, F. Bacao, and T. Oliveira (2015) 'The Education-Related Digital Divide: An Analysis for the EU-28', *Computers in Human Behavior*. 56: 72-82.
- Cyrus, J. D. (2008) 'Aligning NETS*T Standards with Technology Integration for Kosrae Teachers', *International Journal of Pedagogies and Learning*. 4(4): 96-112.
- Cullen, R. (2001) 'Addressing the Digital Divide', *Online Information Review*. 25(5): 311-320.
- Dewan, S., and F. J. Riggins (2005) 'The Digital Divide: Current and Future Research Directions', *Journal of the Association for Information Systems*. 6(12): 298-337.
- DiMaggio, P., E. Hargittai, C. Celeste, and S. Shafer (2004) 'Digital Inequality: From Unequal Access to Differentiated Use', in: K. Neckermaned *Digital Inequality*, 1st ed. New York: Russell Sage Foundation.
- Epstein, D. D., E. B. Nisbet, and T. Gillespie (2011) 'Who's Responsible for the Digital Divide? Public Perceptions and Policy Implications', *Information Society*. 27(2): 92-104. doi:10.1080/01972243.2011.548695
- Fullan, M. (2017) 'Trends in Digital Learning: Building Teachers' Capacity and Competency to Create New Learning Experiences for Students', *Blackboard*. [online] Available at: http://images.email.blackboard.com/Web/BlackboardInc/%7B6651397a-eb7d-4088-8471-3eac0140990a%7D_K12_2017_Report_TrendsInDigitalLearning.pdf [30 June 2017].
- Guam Department of Education (2012) *Student cellphone use on school campus*. [online] Available at: <https://docs.google.com/viewer?a=v&pid=sites&srcid=Z2RvZS5uZXR8Z3VhbS11ZHVjYXRpb24tYm9hcmR8Z3g6NGIxYjhiNTFkMzY5ZGNjMQ> [2 Jul. 2017].
- Guam Department of Education (2014a) *Children's Internet Protection Act: Internet*

