

COVID-19 Professional Development in Hawai‘i: Teachers as Public Health Educators

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Abstract

Teacher leadership and agency can provide time sensitive, trusted information during times of uncertainty. A Native Hawaiian teacher’s place and culture-based COVID-19 lessons inspired a multidisciplinary team funded by NSF and NIH to develop four place-based, culturally responsive COVID-19 curricular modules. Educator-led outreach via in-person and online presentations was coupled with a project website that provided K-12 educators with independent learning to support teaching of COVID-19 in the contexts of: 1) historical epidemics in Hawai‘i, 2) student inquiry into family health, 3) protection and prevention, and 4) vaccines, variants, and disinformation. Major findings include high ratings from Native Hawaiian and Pacific Islander educators, increased downloads of modules following outreach, selection of Module I History of Infectious Diseases in Hawai‘i and the Pacific as most valuable, and high engagement of elementary teachers. Teachers were most concerned about students mental health and disinformation. Those who taught the curriculum gave higher rating to leadership and governance in their schools and communities and were most interested in professional development as public health educators. Findings suggest that place-, culture-, and inquiry-based curriculum and professional development situated in students’ lives and communities has the potential to support teachers as public health leaders and communicators during times of change and uncertainty.

INTRODUCTION

The COVID-19 pandemic is estimated to have disrupted the education of 1.5 billion learners in over 200 countries (Pokhrel & Chhetri, 2021). The negative impacts of COVID-19 school shutdowns on student learning in the U.S. predicted in 2020 by Kuhfeld et al were confirmed in national and international studies. World Bank researchers Patrinos, Vargas, and Carter-Rau (2022) reviewed 35 studies across 20 countries and found 32 reported learning losses, greater among children from disadvantaged circumstances who were already lagging, that increased the longer schools were closed. Di Pietro’s (2023) meta-analysis of 39 studies across 19 countries showed the legacy effects of the pandemic on mathematics and science learning as well as on students’ mental health and physical well-being. Uthappa et al (2023) found that mathematics and reading scores of K-8 students in 15 district of N, Carolina decreased during school shutdowns, with in-person instruction associated with mathematics proficiency more than reading. According to Sparks (2022), teachers in the U.S. suffered greater anxiety about the pandemic than health-care workers. As frontline workers at the interface of government policies on COVID-19 and parents with opposing ideas, some may have felt threatened as were COVID-19 scientists and public health leaders who needed protection from threats (Nature 2021) as the pandemic and public health policies became more politicized and disinformation spread. Goldhaber et al’s (2023) U.S. analysis of more than 2 million grade 3-8 students test data showed math gaps increased when students were in remote learning but did not when instruction remained in person. Particularly affected were students in high poverty districts that also tended to remain in remote instruction longer than low-poverty schools. Two themes across these articles were a call for improved education and communication from the level of governments to households and a recognition of disparate impacts on underserved and vulnerable populations.

Thus this case study of teacher agency and curricular leadership on COVID-19 curriculum for underrepresented groups in Hawai'i may offer insights into ways in which educators in underserved and vulnerable communities in the Pacific and elsewhere might actively contribute to managing and mitigating public health issues. The study explored the following research questions:

1. How did teachers evaluate place and culture based COVID-19 curriculum oriented to understanding, managing and mitigating COVID-19?
2. What challenges and concerns did teachers report during COVID-19 lockdown and subsequent return to school?
3. Were teachers interested in a role as public health educators? If so,
4. How do they recommend being prepared as public health educators?
5. Finally, Is there any relationship between the evaluation and use of curriculum and teachers' perceptions on community reorganization and governance leadership?

THEORETICAL Framework

Sewell (1992) theorizes that individuals' diverse, cross-cultural life experiences allow access to multiple sociocultural structures, e.g., schemas or mental models. Educational settings provide pathways into different discourses, identities, ways of building knowledge, and power (Gee 1990). Sewell further theorizes that an individual's knowledge of multiple schemas is a source of agency, the ability to exert "some degree of control over the social relations in which one is enmeshed" (p. 20). The social embeddedness of agency implies "the extent of the agency exercised by individual persons depends profoundly on their position in collective organizations" (p. 21). This suggests individuals from different fields who form a community of practice to work towards a common goal supports individual and collective agency through the intersection of different cultural mental models and schemas and the material and immaterial resources each member contributes. This process develops a new hybrid structure with its own power and set of resources with the potential to mobilize resources to maintain itself. Wenger's (2000) communities of practice show Sewell's theoretical framework in action.

METHODOLOGY AND METHODS

Crowe et al (2011) suggest case study methodology to explore the complex impacts of diseases in real world settings. The case study will highlight key intersections that shaped the directions of the research in a community of practice (COP) that included elementary and secondary teachers and social science, medical and science education researchers. The COP engaged in COVID-19 research from January 2020 to December 2023, times of uncertainty about the virus, its impact on human health, misinformation, shutdown and reopening of schools and businesses, and politicization of new vaccines and public health measures. Qualitative methods include field notes, participant-observation, action research, document analysis, and responses to survey questions. Quantitative methods include statistical analysis of downloads of curriculum and responses to Likert surveys developed by the team. Participants include attendees of COVID-19 information sessions, e.g., town halls and workshops held from July 2020 and educators who accessed the Pacific Alliance Against COVID-19 website to download curriculum, get certified on modules, and respond to four surveys from June 2021 to June 2023..

RESULTS

Teacher Agency: Developing a Place-based, Culturally Sustaining COVID-19 Curriculum

The case study began with 2 teachers in Chinn's NSF award for teacher leadership (Chinn 2017). In January 2020 as an unknown viral disease spread from China to the U.S., the threat to Hawai'i was recognized by Hanohano, a Native Hawaiian, director of a Hospitality Academy and teacher of Hawaiian language, Hawaiian Studies, and Economics. Realizing that the disease would put Hawai'i's tourist

economy and people at risk, she grounded her lesson in Princess Lili‘uokalani’s 1881 order, made over the objections of the business community, to close the ports of Honolulu to prevent smallpox from reaching neighbor islands. The public health actions of Hawaiian royalty to manage and mitigate impacts of introduced diseases that killed an estimated 90% of Native Hawaiians (NH) and Pacific Islanders (PI) after western contact became the piko (focus) of Module I *History of Infectious Diseases in Hawai‘i and the Pacific*, co-authored by Hanohano, Chinn, and two NH graduate assistants with Hawaiian language and science backgrounds. Serendipitously, one worked in a lab led by Maunakea, who focused on NH health disparities. Knowledge that health disparities of NH-PIs and Filipinos put them at higher risk for COVID-19 led her to write Module II Mo‘okū‘auhau: My Genealogy and Beloved ‘Ohana Bubble curriculum. Students learn about COVID-19 comorbidities, multiple health conditions, then share that knowledge with family members to co-construct a multigenerational family tree of health. This vulnerability assessment guides practices of care as it strengthens communication within the family. Yasuoka’s Module III Protection and Prevention reflected her concerns as an elementary teacher, mother, and caregiver of elderly relatives.

Sharing teacher developed lessons with educators established a trusted peer to peer network when teachers needed reliable information from trusted sources. The Kūpa‘a (to stand firm) Collective website initiated and moderated by Yasuoka served as a peer-to-peer hub to download the curriculum, COVID-19 information, and post comments. A workshop participant wrote:

[It] is important for us as kumu (teachers) to have a space amongst peers where we can share, learn, and grow together. This is always important, but most especially in this time.. I appreciate the way your team emphasized the importance of talking about Covid-19 with students because it is dominating every part of our lives at the moment. Being encouraged to meet this problem head on empowers us as teachers and as a community.

Module IV “Testing, Vaccinations, Variants” written by Chinn and Maunakea was updated several times to address new mRNA vaccines, variants, and misinformation (Neely et al 2022). In fall 2021, as the rate of infections in Pacific Islanders and Filipinos decreased while rates in whites and African Americans increased, we gave an invited televised presentation employing Tiktoks and animations to communicate with a general audience.

Pacific Alliance Against COVID-19 (PAAC), RADx-UP, NIH

The intersections of research on underrepresentation in STEM and health disparities of NH-PI led to the Pacific Alliance Against COVID-19, a RADxUP (Rapid Acceleration of Diagnostics-Underserved Populations) award (Okihiro et al 2020) to examine the role of teachers as active partners in public health education. A PAAC website expanded outreach via posting of curricular modules with 15-minute videos, and a portal for data collection using surveys, curricular downloads, and quiz-based certifications on each module. Outreach by the team allowed the frequency of downloads to be correlated with team activities and external events. Peer networks led to a request to translate a COVID poster into Hawaiian language for NH who are 40% of incarcerated populations, twice that in the state population. We received this thank you:

Please accept our sincere gratitude for your facilitating the Hawaiian translation of “The Straight Scoops on Vaccines”...this document has been shared widely in Hawai‘i in correctional institutions...and shared on listservs across the Pacific, the US continent and the world! When people ask us if they can copy it, we tell them that this document is like love – it only works when you give it away!

Our first survey in June 2021 yielded baseline demographic information from 472 teachers who had been certified on at least one module. About 42% taught in elementary schools, followed by 29.5% in high

school, 21.5% in middle school, and 6.5% Other. NH teachers were 19.2% of respondents, vs. 10.3% of public school teachers suggesting receptivity to peer written, place-based, culturally sustaining content. All except white teachers were overrepresented: Japanese, 25.8% vs 21.8%; Chinese, 10.8% vs. 3%; and Filipinos, 9.9% vs. 8%. Hawai'i has the highest % of multigenerational households in the U.S., with 17.1% of Filipinos, 13.6% of Native Hawaiians and 11.9% of Chinese living in multigenerational households (Juarez et al 2023), suggesting awareness of this risk factor for COVID-19. Only Caucasians, 25.6% vs. 25.1% were proportionally represented.

Survey 2 in November 2021 yielded 198 responses. It was sent to all teachers certified on at least one module. When asked to choose a module to provide feedback on, 55.6% selected Module 1 History of Infectious Diseases in Hawai'i and the Pacific, followed by Module 3 Protection and Prevention (16.6%), Module 4 Testing, Vaccinations, Variants (14.7%), and Module 2 Mo'okū'auhau (13.1%). More than 70% of respondents were "Extremely likely" or "Somewhat likely" to use one or more modules in class.

Survey 3 in May 2022 yielded 203 responses on teachers' use and thoughts on the modules and misinformation or disinformation. Perceptions on school and community governance structures related to the pandemic were collected to see if these were related to the use of modules. We found that teachers who used modules in their class had a significantly higher average score of leadership-governance in the community than teachers who did not (22.768 vs. 20.635, p-value = 0.059). This positive relationship was also found with teachers who rated the modules as "very useful" or "useful" giving higher scores on community reorganization ability (43.889 vs. 39.725, p-value = 0.009) and overall governance-leadership indices (47.913 vs. 42.609, p-value = 0.053). Feeling safe and protected against COVID-19 at school was associated with positive perception of reorganization ability by 1.610 points [1.610, p<0.01; 95%CI=(0.384; 2.837)] and leadership-governance by 4.387 points [4.387, p<0.1; 95%CI=(2.121; 6.654)] compared to teachers who did not. Public school teachers gave a higher score for the leadership at their school and community than teachers in private or charter schools (46.470 vs. 39.808, p-value = 0.040). They were also more likely to believe in the reorganization ability of the community and school by 3.456 points [3.456, p<0.05; 95%CI=(0.069;6.842)] and leadership-governance by 5.965 points [5.965, p<0.1; 95%CI=(-0.293;12.225)] than teachers in private and charter schools. (See Figure 1)

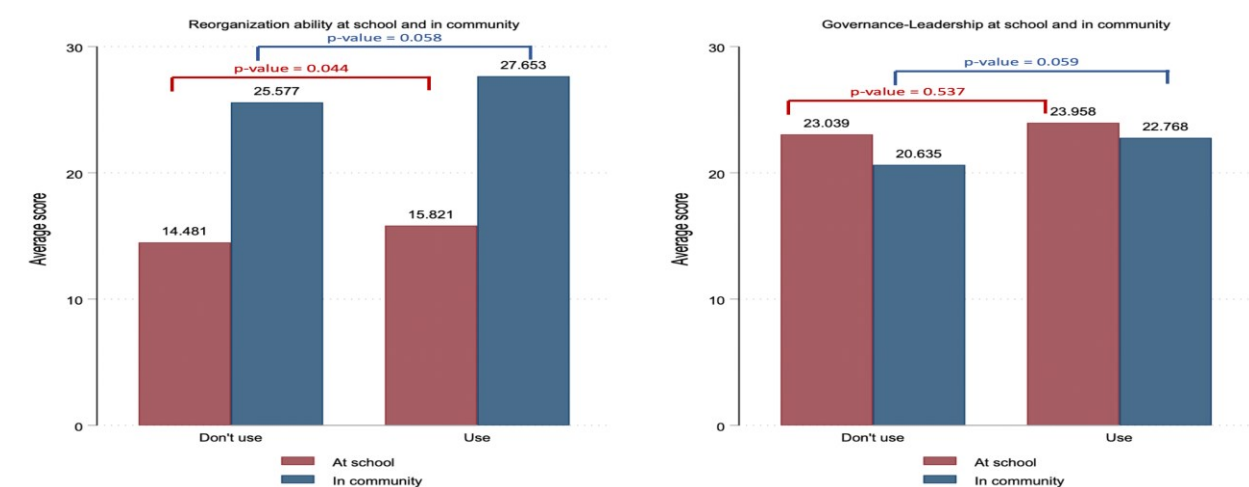


Figure 1 : Average score of reorganization ability, leadership-governance, and willingness to participate in co-design, willingness to use/teach/ pilot new public health curriculum of teachers using educational modules.

Native Hawaiian and Pacific Islander teachers rated our educational modules higher than other ethnic groups. Nearly 85% of NHPI teachers in the survey rated them as "Useful" or "Very useful" vs. 61% of non-NHPI teachers. T-tests show the average module usefulness score of NHPI teachers is 4.15, significantly higher than the score of 3.54 of non-NHPI teachers (two-sided p-value = 0.000). Teachers

living outside of Honolulu county evaluate the modules as significantly more useful, 3.97, than those in Honolulu, 3.57 (t-test two-sided p-value = 0.03). Census data shows Honolulu county has the lowest % of Native Hawaiians. Significant differences by ethnicity and geography suggest teachers are more engaged in learning and utilizing the curriculum when content and cultural contexts are meaningful to them and their students.

As teachers' views of module usefulness increased, their views of their role as public health educators also increased. They were more willing to participate in a pilot co-design of a new culturally-based curriculum to address misinformation or disinformation among students and their families by 0.248 points [0.248, $p < 0.01$; 95%CI=(0.087; 0.408)], and more willing to teach a new culturally-based curriculum to address misinformation or disinformation among students and their families by 0.272 points [0.272, $p < 0.01$; 95%CI=(0.109; 0.434)].

Teachers who used modules in class were more likely to agree with the role of teachers as the public health educator by 0.326 points [0.326, $p < 0.01$; 95%CI=(0.107; 0.544)] than teachers who did not. They were more willing to co-design a new culture-based curriculum to address misinformation or disinformation among students and their families by 0.641 points [0.641, $p < 0.01$; 95%CI=(0.332; 0.949)] and more willing to teach a new culture-based curriculum by 0.485 points [0.485, $p < 0.01$; 95%CI=(0.171; 0.796)].

Teachers in middle school were more willing to teach or use or pilot a new culture-based curriculum to address misinformation among students and their families than teachers in other grades. Teachers aged above 55 were less likely to participate in co-designing a new culture-based curriculum by 0.417 points [-0.417, $p < 0.1$; 95%CI=(-0.858; 0.024)] and less willing to teach/use/pilot a new curriculum by 0.381 points [0.381, $p < 0.1$; 95%CI=(-0.825; 0.064)].

Outreach effectiveness was measured by module downloads.

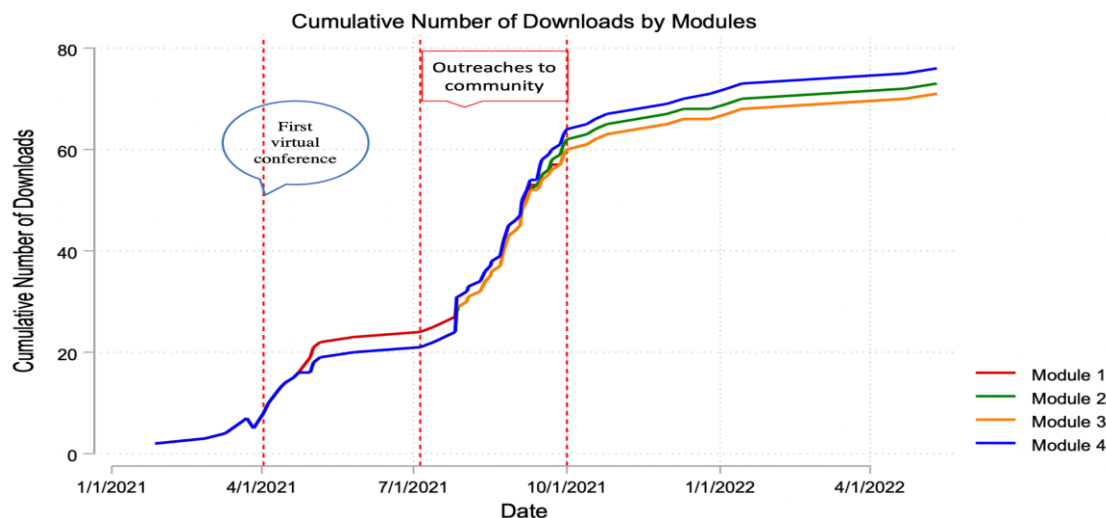
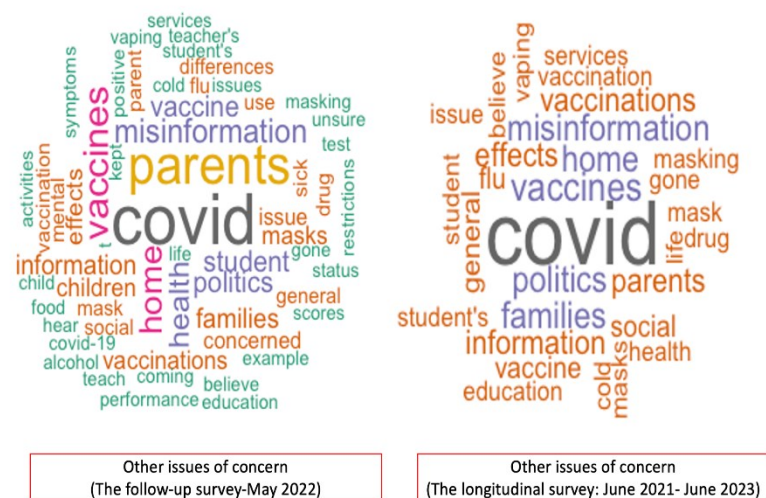


Figure 2: Cumulative number of downloads by modules (January 2021- May 2022)

Download trends of modules from January 2021 to May 2022 showed noticeable uptick in teachers seeking out, downloading, and completing certification during periods when the PAAC program was actively promoted via conferences, workshops, and symposia (See Figure 2). April, July, August, and

September of 2021 showed a statistically significant increase (2-sided t-test, p-value = 0.056) in daily downloads, averaging 5.824 vs. 4.429 times/day in other months. The downloads of 72.3% of modules by elementary and kindergarten teachers suggest their interest in learning more in order to teach their students.

When asked about their willingness to participate in a pilot co-design of a new culture-based curriculum and their willingness to use/teach/pilot this new curriculum to address misinformation or disinformation among students and their families, teachers who used modules in their classes had a significantly higher score of willingness to participate in co-design (1.761 vs. 0.88, two-sided p-value = 0.000), and a higher score of willingness to use/teach/ pilot a new culture curriculum (1.794 vs. 1.030, two-sided p-value=0.000) than teachers who did not.



The results from Natural Language Processing are shown in Figures 3 and 4. In the word clouds, more frequent words appear in larger fonts. To examine whether there are differences in teachers' feedback between those who completed a one-time survey with those who consistently participated in four rounds of surveys, we provided two word clouds in each figure. In figure 3, the word cloud was generated by responses "Besides COVID-19, what topics of misinformation or information are a concern among your students or their families?" The word clouds show that "COVID-19", "parents, politics", "misinformation", "vaccines", "information", and "families" were major concerns.

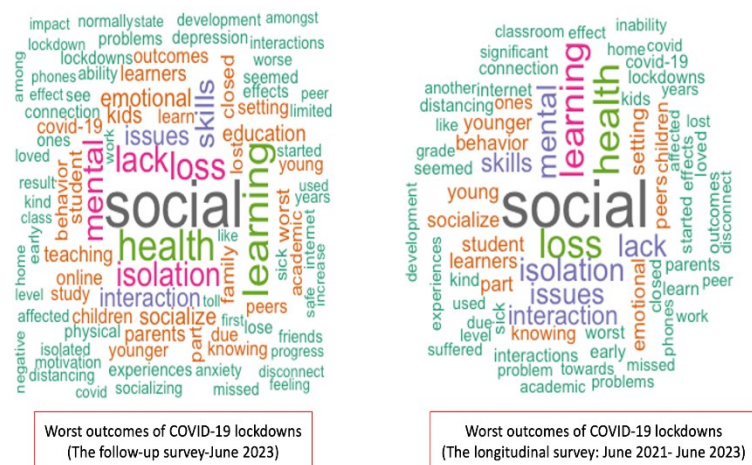


Figure 4: June 2023 and longitudinal survey June 2021-June 2023.

To analyze public health issues, teachers were asked “What issues around public health have appeared within your classroom over the years as an educator?” Nearly 92% of respondents selected “Social, emotional, psychological health and well-being,” followed by “Healthy lifestyle” (58.92%), Building resilience and Epidemics/pandemic (> 56% each), Access to healthy food, dynamics of healthy eating (50.81%), Disinformation and its impacts (49.7%), Depression and thoughts of suicide (49.2%), and Violence in the home (48.1%)..

Finally, when asked: “What would help develop wider knowledge of public health or wellness issues?.” Most chosen by 72.3% was professional development, e.g., 3-credit college course, followed by 57.6% including Hawai‘i’s history of introduced diseases and impact on people, economy, and political system in courses or curriculum, 50.8% workshop with local health experts with certificate of completion, 41% webinar on COVID-19 and other infectious diseases with local health experts and educators; and last, 38.4% update the online PAAC COVID-19 curriculum with certificate of completion. Other resources mentioned by teachers that would help develop wider knowledge of public health or wellness issues in the community are training teachers of health and wellness at schools, training of staff nurses and vice principal/principal; and involving students and family in sharing their knowledge and what they observed.

DISCUSSION AND CONCLUSION

This case study aimed to investigate the role of teacher developed educational curriculum on teachers’ perception on the ability of reorganization after COVID-19 at their school and in their community. We also examined teachers’ views of their role as public health educators, and their willingness to use teacher-developed, place- and culture-based, inquiry-oriented curriculum that conveyed the tragic impact of infectious diseases in Hawai‘i, prepared students to assess COVID-19 risk factors in their families, taught practices to manage and mitigate COVID-19 risk, and addressed vaccine misinformation or disinformation among students and families.

We found these answers to our 5 research questions:

1. How do teachers evaluate place and culture based COVID-19 curriculum oriented to understanding, managing and mitigating COVID-19?

We found that Hawai‘i’s teachers viewed COVID-19 curriculum specifically oriented to place and culture positively. Module I History of Infectious Diseases in Hawaii and the Pacific had the

highest ratings for use in their classes by teachers regardless of grade and subject matter. Native Hawaiians and Pacific Islanders were most positive about this module and were overrepresented among respondents.

2. What challenges and concerns were experienced during COVID-19 lockdown and subsequent return to school?

Teachers identified “Social, emotional, psychological health and wellbeing” as the dominant concern at their school, with 93.1% of females and 90.6% of males selecting this option. Word clouds showed that “COVID-19”, “parents, politics”, “misinformation”, and “vaccines”, “information”, “families” were teachers' major concerns.

3. How interested are teachers in an active role as public health educators?

Teachers who used the modules in their classes were significantly more willing to participate in co-design and to use/teach/ pilot a new culture curriculum than teachers who did not. We did not expect Kindergarten and elementary teachers to be responsible for 72% of curriculum downloads as it was developed for secondary students. The downloads suggest their interest in learning in order to develop their own knowledge as well as teach their students. This suggests that future K-12 public health initiatives take into consideration teachers who stay with children for an entire school year; providing interdisciplinary instruction that includes core public health practices; and have frequent communications with parents and caregivers.

4. What do teachers say about being prepared as public health educators? Were teachers interested in a role as public health educators?

We found that nearly 75% of teachers would like to have professional development sponsored by the State Department of Education or University on COVID-19 and other infectious diseases with nearly 60% wanting the inclusion of Hawai'i's history of introduced diseases and impact on people, economy, and political systems. We found that more females, 75%, than males, 67% and 79% of teachers 29 years or younger, thought professional development would help develop wider knowledge of public health and wellness.

5. Is there any relationship between use or intended use of curriculum and teachers' perceptions on community reorganization and governance leadership?

The survey data suggests positive relationships between the perceived utility and use in classes of the educational modules and 1) teachers' faith in community and school resilience and governance, 2) willingness to participate in co-design of public health curriculum 3) interest in further professional development, and 4) congruence with Native Hawaiian and Pacific Islander teacher and students' lives and histories. No statistically significant differences were found by subject areas or primary or secondary school status in teachers' use of the modules.

Our findings underscore the potential broader impact that public health communities of practice that include teachers in co-design of curriculum, testing, and outreach can have not just on classroom instruction and teacher agency, but also on community and institutional perceptions and preparations during public health crises. The creation of well-designed educational resources from trusted communicators should be a priority of public health providers in a time of increased threats from diseases, distrust, and politicization of public health policies.

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