📖 **Makers in the Library**
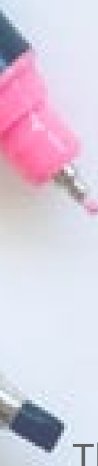
The New Face of Library Makerspaces

Programming & Delivery Models During the Pandemic

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→ Introduction

The New Face of Library Makerspaces project aims to create a national Collective of library members designed to share resources and learnings about how library makerspaces have and will continue to shift their services and programming post-pandemic. Supported by a grant from the Institute of Museum and Library Services (IMLS), this project will prioritize diverse and inclusive community building, both within the professional Collective itself and for the libraries they serve. Activities for the two-year project will begin by researching models for the Collective, forming a charter group of libraries to co-create the Collective's structure, serve as leaders, and help it expand, developing professional development opportunities, and creating an addendum for the existing Makers in the Library toolkit (MakersintheLibrary.org) that incorporates learnings from Collective members and new approaches to in-person and digital programming.

Findings from this project will generate best practices for developing, assessing, and sustaining maker activities in libraries following the COVID-19 pandemic. Members of the Collective's inaugural charter group include public libraries and librarians from across the country who have developed and maintained diverse models of makerspaces for their communities.

To begin the process of helping to inform the future of makerspaces in public libraries in a not quite post-pandemic environment, project staff worked with the Rockman et al Collaborative (REA), a national research and evaluation firm, to design and administer a survey for libraries across the country to collect opinions on their experiences during the COVID-19 pandemic, and to establish priorities to support public makerspaces.

Survey items were developed by REA with project staff. The online survey was administered online from March – May 2022. Some of the key topic areas that this national survey was designed to learn more about include:

- Types of library makerspace programs and program models delivered during the pandemic
- The most and least successful makerspace programs
- Audiences served
- New audiences reached
- New skills/knowledge attained
- Development of new library policies and protocols

Survey Respondent Characteristics

In this study, 126 surveys were analyzed, with 69% representing a library system and 30% representing a branch library. According to the results of the analysis performed, the majority of surveys were completed by those residing in California (26%), followed by Colorado (10%), Arkansas (9%), Idaho (9%), Illinois (9%), and Missouri (6%) (see Figures 1a & 1b for the geographical distribution of respondents). Most respondents either identified as a librarian (37%), administrator (34%), or program director (21%).

Figure 1. Nationwide Distribution
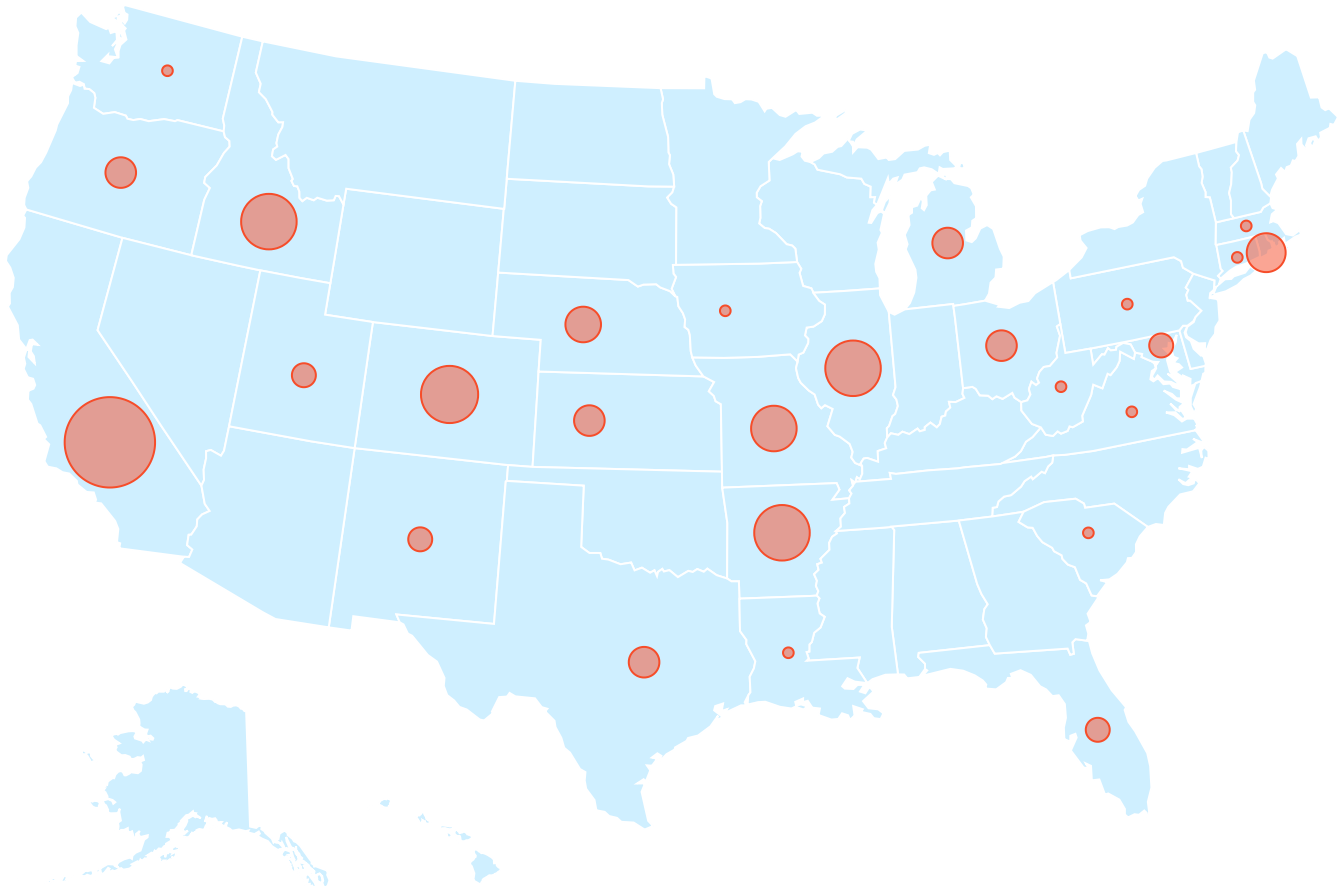
Note: The circle sizes above are relative to the number of responses from that state; larger circles represent more respondents.

Populations Served

Numbers Served

The majority of respondents reported serving between 25,001-100,000 (34%) and up to 25,000 (32%) (see Figure 2 for numbers served).

Figure 2. Numbers served

Up to 25,000 served	32%
25,001 -100,000 served	34%
100,001 - 250,000 served	16%
250,001 - 500,000 served	8%
500,001 - 2,000,000 served	6%
2,000,001+ served	4%
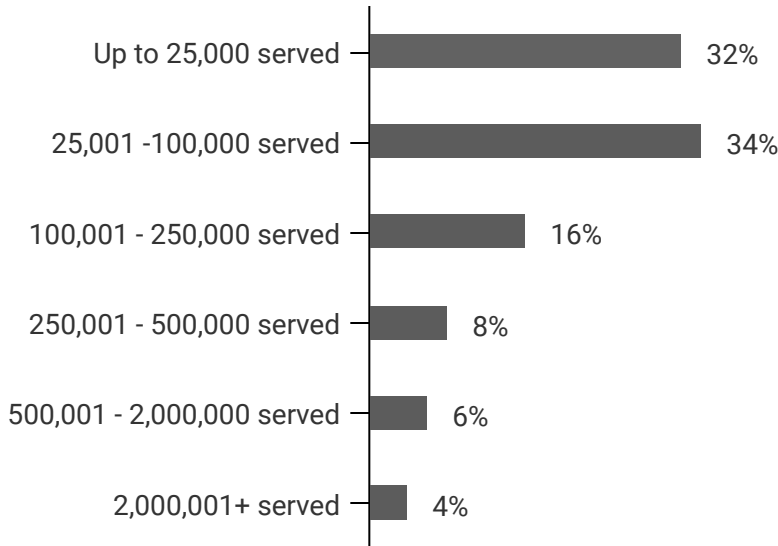
Community Description

Slightly more than half of respondents described their type of community that their library serves as suburban (52%), followed by rural (44%), and urban (29%; Figure 3). Smaller percentages of respondents described their community as both rural and suburban (8%); both urban and suburban (6%); urban, rural, and suburban (6%); and both urban and rural (1%). Well over half of respondents (61%) reported that their library maker programming is not coordinated between branches in their system.

Figure 3. Community type (COUNTS OF RESPONSES)

- ● Suburban only — 39
- ● Urban only — 20
- ● Rural only — 34
- ● Rural & Suburban — 10
- ● Urban, Rural, & Suburban (ALL) — 7
- ● Urban & Suburban — 7
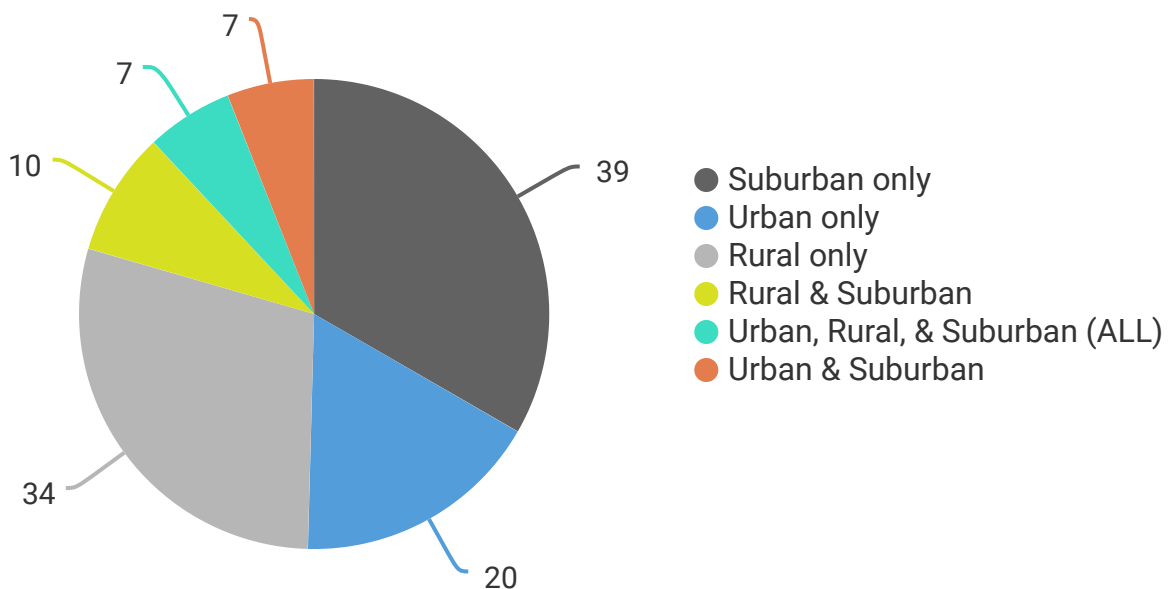
Populations Served

Type of Makerspace

Survey respondents were asked to select which type of makerspace their library had pre-pandemic from a list of categories that apply:

- Dedicated space (space specifically designed for maker activities),
- Multi-use space (converted temporary space for maker activities),
- Community events (e.g., Maker Faire),
- Maker box program (tools/materials for maker activities that can be circulated amongst patrons/library branches)
- Virtual (asynchronous or synchronous online maker activities),
- Outreach or partnership program (e.g., programming brought to daycares, after school programs), or
- Other:
  "Regular classes."
  "We didn't have a regular maker program."
  "Run maker/Stem activities wherever we could in shared spaces."
  "Single library. Maker materials brought out for programs."
  "Innovation Studio grant from Nebraska Library Commission where we hosted maker equipment for 30 weeks."
  "Includes "Library of Things" available for checkout."

In aggregate, most respondents selected either a dedicated space (59%) or multi-use space (43%; Figure 4a). The following page illustrates a breakdown of makerspace type by community type.

Figure 4a. Type of makerspace pre-pandemic (all that apply selected)

Respondents were asked to "select all that apply." Hence, totals exceed 100%.
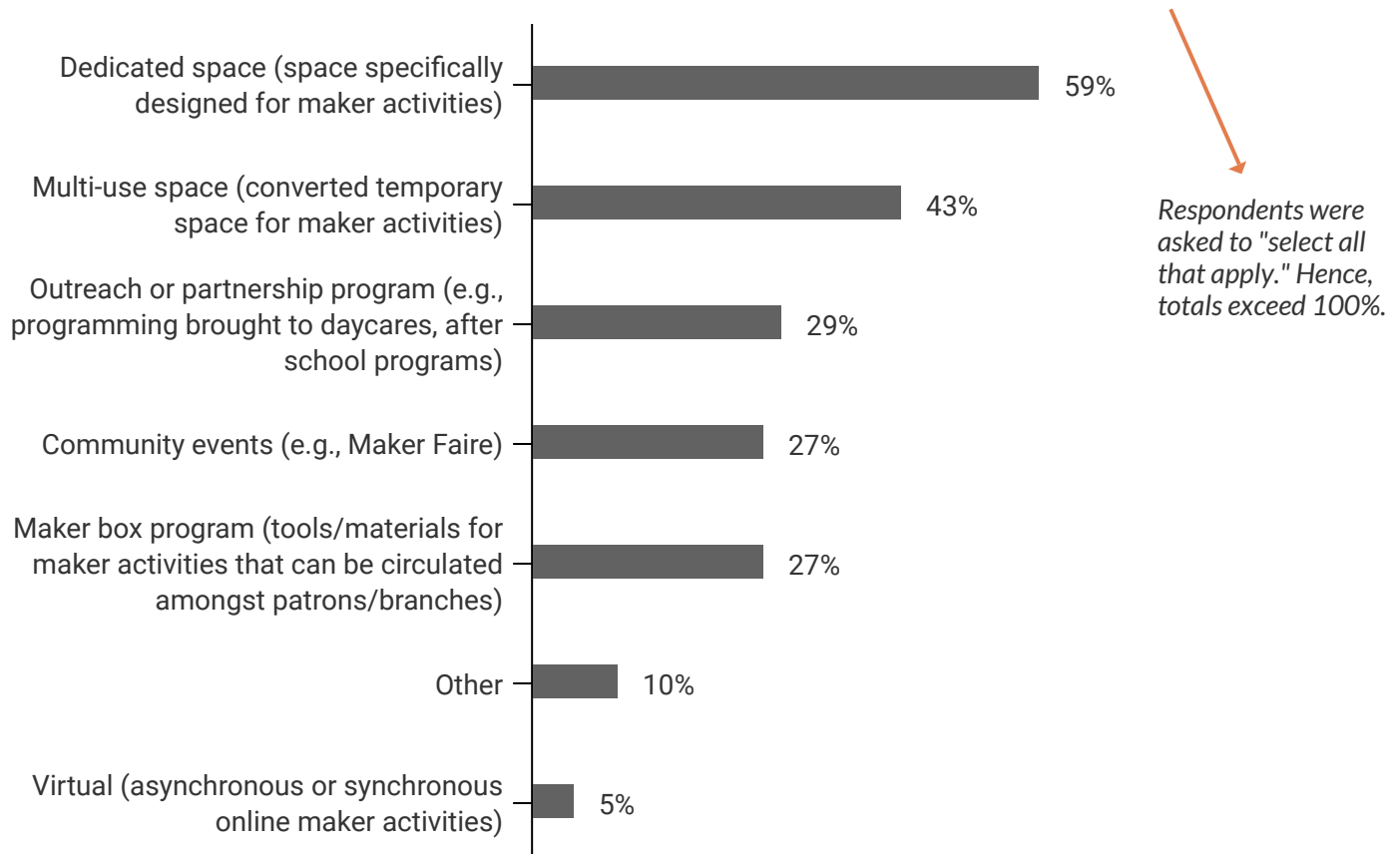
Populations Served

Type of Makerspace

When examining the type of makerspace their library had pre-pandemic (by community type), we found that urban communities tended to utilize community events significantly more than rural and suburban communities, both of which did not utilize community events at all. On the other hand, with the exception of urban communities using community events, all communities tended to use dedicated spaces (spaces specifically for maker activities) and maker box programs (tools/materials for maker activities that can be circulated amongst patrons/branches) the most (Figure 4b).

Figure 4b. Type of Makerspace (BY COMMUNITY TYPE)

Type	Urban (n=20)	Suburban (n=39)	Rural (n=34)
Dedicated space (space specifically designed for maker activities)	65%	74%	41%
Multi-use space (converted temporary space for maker activities)	50%	38%	53%
Outreach or partnership program (e.g., programming brought to daycares, after school programs)	30%	31%	38%
Maker box program (tools/materials for maker activities that can be circulated amongst patrons/branches)	40%	21%	32%
Virtual (asynchronous or synchronous online maker activities)	15%	5%	
Other	10%	5%	18%
Community events (e.g., Maker Faire)	55%		

Populations Served

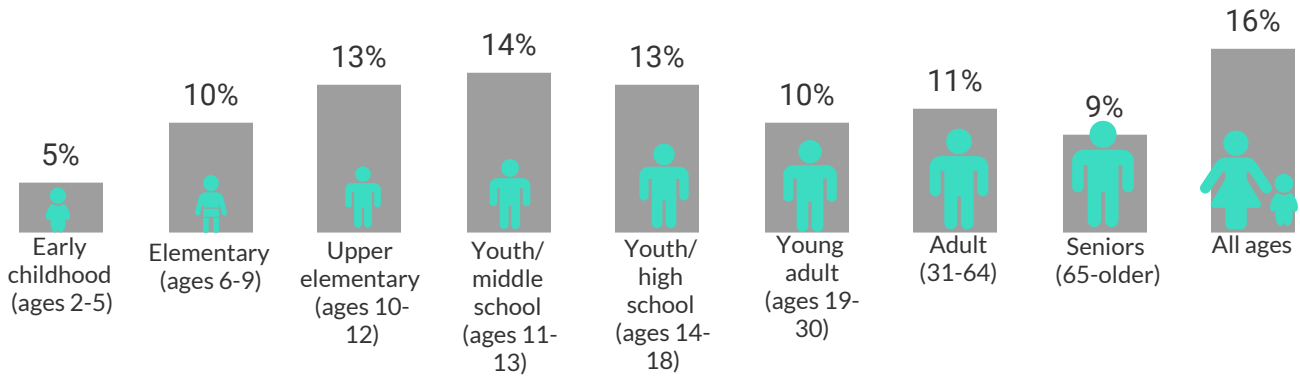## Age Distribution of Populations Served

Figure 5 illustrates the percentages of age-groups served. While the distribution of ages served by their library makerspace program was relatively even, the majority of survey respondents reported serving all ages (16%), followed by youth/middle school (14%), upper elementary (13%), youth/high school (13%), adult (11%), young adult (10%), elementary or ages 6-9 (10%), and seniors (9%). Respondents reported serving early childhood children (or ages 2-5) the least out of all age groups (5%).
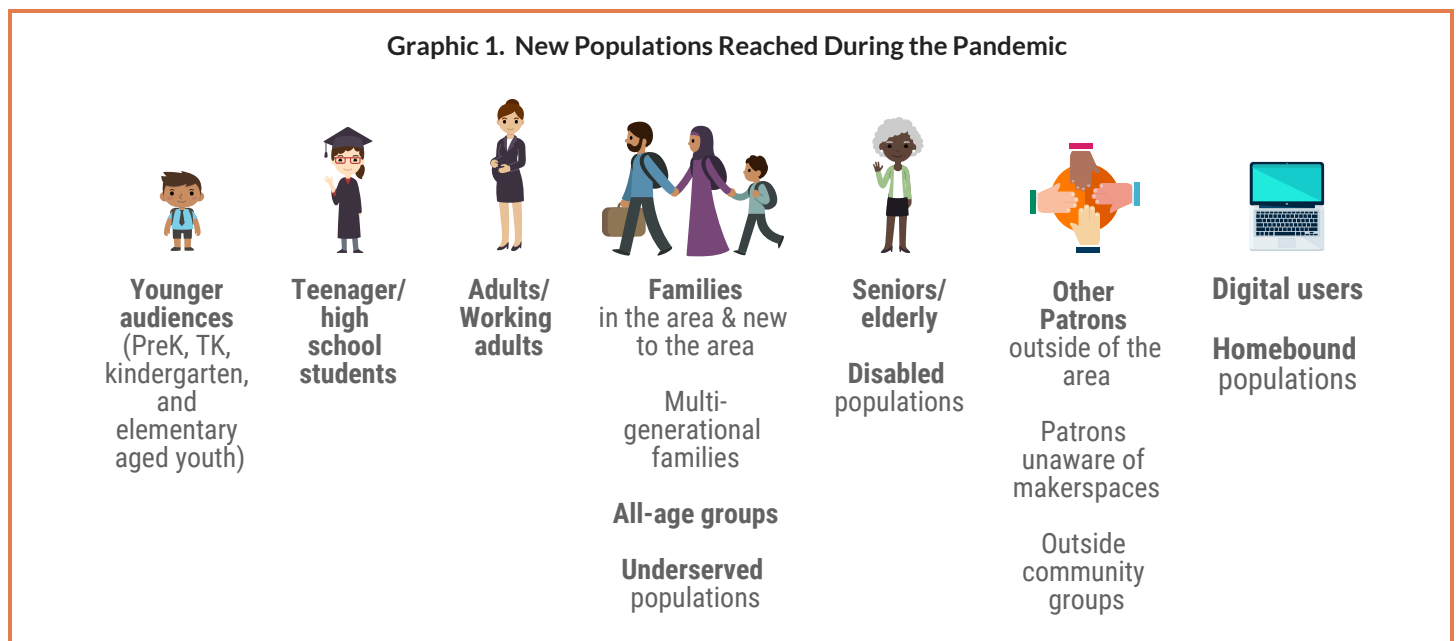
Figure 5. Ages Served by Library Makerspace Programming

5%	10%	13%	14%	13%	10%	11%	9%	16%
Early childhood (ages 2-5)	Elementary (ages 6-9)	Upper elementary (ages 10-12)	Youth/ middle school (ages 11-13)	Youth/ high school (ages 14-18)	Young adult (ages 19-30)	Adult (31-64)	Seniors (65-older)	All ages

New Populations Reached During the Pandemic

Over half of respondents reported reaching new audiences during the pandemic (53%), while about one third of respondents (32%) reported being unsure; just 15% of respondents reported not reaching new audiences during the pandemic (see Graphic 1 for illustration of new populations reached).

Graphic 1. New Populations Reached During the Pandemic

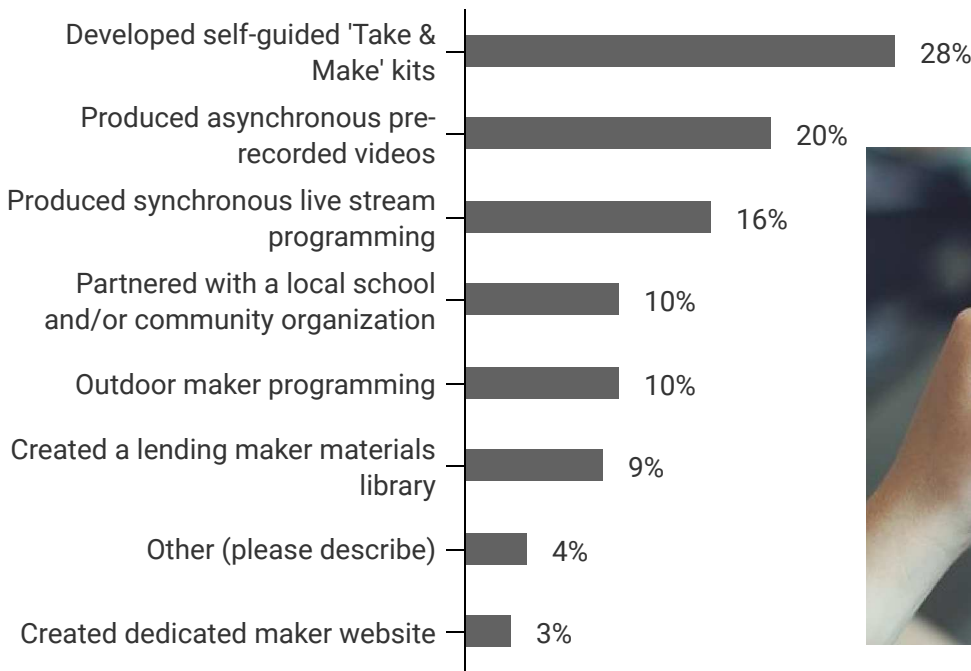| **Younger audiences** (PreK, TK, kindergarten, and elementary aged youth)	**Teenager/ high school students**	**Adults/ Working adults**	**Families** in the area & new to the area Multi-generational families **All-age groups** **Underserved** populations	**Seniors/ elderly** **Disabled** populations	**Other Patrons** outside of the area Patrons unaware of makerspaces Outside community groups	**Digital users** **Homebound** populations

Programming During the Pandemic

Survey respondents overwhelmingly reported having maker activities during the pandemic over the past two years (81%) while less than one quarter did not (19%). During the pandemic, respondents mostly developed self-guided 'take and make' kits (28%), produced asynchronous pre-recorded videos (20%), and produced synchronous live stream programming (16%) as ways to innovate on their program delivery models.

Figure 6a. Ways of innovating on program delivery models during the pandemic

Category	Percentage
Developed self-guided 'Take & Make' kits	28%
Produced asynchronous pre-recorded videos	20%
Produced synchronous live stream programming	16%
Partnered with a local school and/or community organization	10%
Outdoor maker programming	10%
Created a lending maker materials library	9%
Other (please describe)	4%
Created dedicated maker website	3%

'Other' ways of innovating on program delivery models (see below quotes) included: Zoom meetings or presentations (3), partnering with the city on STEM for Maker Pavilion area, email 3D printing, limited appointments, using grant funds to start makerspace, creating one-on-one programs, increasing the number of Maker checkout kits, and creating online STEAM/Maker classes.

"We held dedicated Zoom programs where patrons would pick up take and make kits and follow along with us online (no in-person programs)."

Library Administrator in Illinois serving suburban communities

"Increased the number of Maker Checkout Kits."

Library Assistant in Texas serving suburban communities

"Created Online STEAM/Maker Classes."
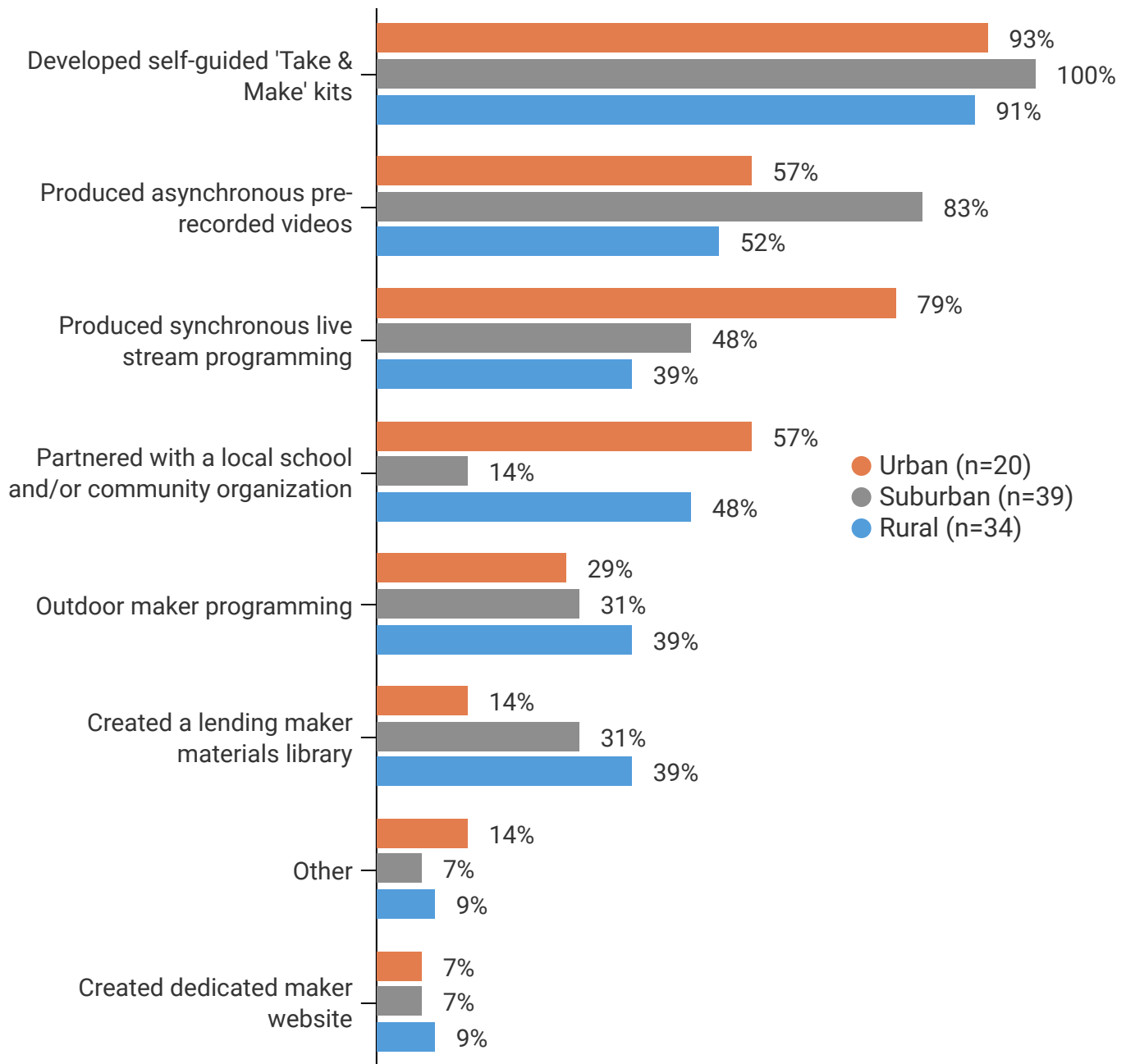
Kit Developer in Rhode Island serving urban communities

Programming During the Pandemic

When looking at ways of innovating on program delivery models during the pandemic (by community type), we found that rural communities utilized both outdoor maker programming and created a lending maker materials library more than suburban and urban communities. Additionally, rural communities tended to produce synchronous live stream programming less than suburban and urban communities. Urban communities produced synchronous live stream programming significantly more than suburban and rural communities (Figure 6b).

Figure 6b. Ways of innovating on program delivery models during the pandemic (BY COMMUNITY TYPE)
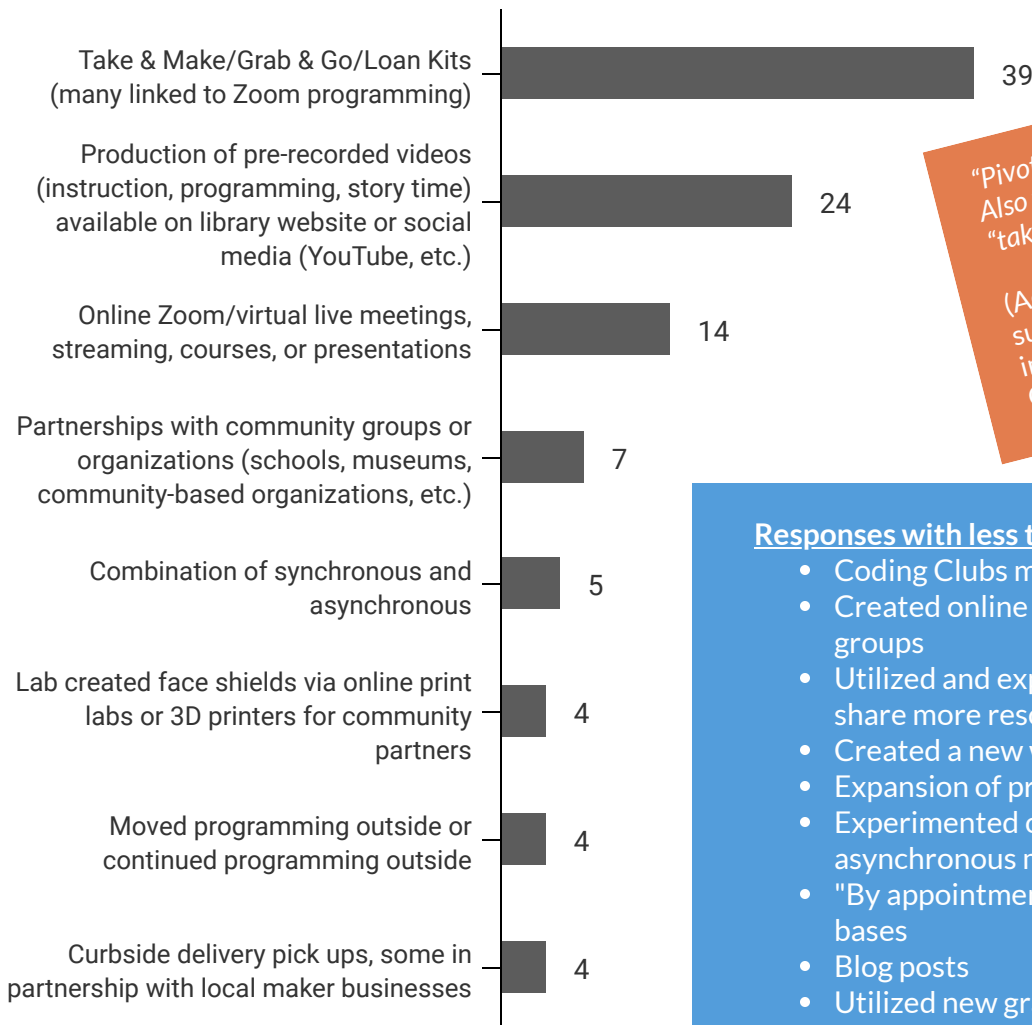

- Developed self-guided 'Take & Make' kits: Urban 93%, Suburban 100%, Rural 91%
- Produced asynchronous pre-recorded videos: Urban 57%, Suburban 83%, Rural 52%
- Produced synchronous live stream programming: Urban 79%, Suburban 48%, Rural 39%
- Partnered with a local school and/or community organization: Urban 57%, Suburban 14%, Rural 48%
- Outdoor maker programming: Urban 29%, Suburban 31%, Rural 39%
- Created a lending maker materials library: Urban 14%, Suburban 31%, Rural 39%
- Other: Urban 14%, Suburban 7%, Rural 9%
- Created dedicated maker website: Urban 7%, Suburban 7%, Rural 9%

Legend:
- Urban (n=20)
- Suburban (n=39)
- Rural (n=34)

Programming During the Pandemic

Ways of Innovating on Program Delivery Models During COVID (Open-Ended Responses)

During the pandemic, lockdowns and library closures changed the way library staff interacted and provided services for their patrons. We asked 3 open ended questions in regard to library programming during and post pandemic. We analyzed the results, coded and group the responses based on thematic similarities. The following is a summary of what we discovered.

Open ended responses to the previous question on ways of innovating on program delivery models during the pandemic were coded based on thematic similarities. The following chart represents thematic groupings by frequency of mention. Using Take & Make or Grab & Go Kits were cited most frequently, following by the production and creation of pre-recorded video that include instruction, program elements, and story time, which were also made available on their own website or on a social media platform.

Figure 7. Ways of innovating on program delivery models during the pandemic (COUNTS OF RESPONSES)

Take & Make/Grab & Go/Loan Kits (many linked to Zoom programming) — 39

Production of pre-recorded videos (instruction, programming, story time) available on library website or social media (YouTube, etc.) — 24

Online Zoom/virtual live meetings, streaming, courses, or presentations — 14

Partnerships with community groups or organizations (schools, museums, community-based organizations, etc.) — 7

Combination of synchronous and asynchronous — 5

Lab created face shields via online print labs or 3D printers for community partners — 4

Moved programming outside or continued programming outside — 4

Curbside delivery pick ups, some in partnership with local maker businesses — 4

"Pivoted hard to online programming. Also flipped "make and take" model to "take and make."

(Administrator in California serving suburban communities on ways of innovating on program models during COVID)

Responses with less than 3 counts:
- Coding Clubs moved online
- Created online programming for specific age groups
- Utilized and expanded pre-existing website to share more resources
- Created a new website for home craft projects
- Expansion of program to accomodate all ages
- Experimented or implemented synchronous and asynchronous models
- "By appointment only" visitation on a limited bases
- Blog posts
- Utilized new grant funds to start Makerspace
- Outreach programming at local schools

Programming During the Pandemic

As stated on the previous page, survey respondents were asked to elaborate on how they innovated on their program delivery models during the pandemic. Additional open ended comments (below) described the development of Take & Make Kits, and producing asynchronous pre-recorded videos.

"We delivered 2500 bags for preK, TK, and kindergarten children in the SBCUSD with books, pencils, rulers, scissors, glue sticks, construction paper, and url links to recorded activities. For 1000 of these bags we partnered with San Bernardino County Public Health and Nutrition to add a 2nd bag of books, and information." (Library Assistant in California serving suburban communities)

"We partnered with our local children's museum to produce STEAM kits that kids could take home and then do the activities with a presenter on Zoom. We also did teen Maker kits with Zoom programs focusing on the arts and STEM. We recorded many of these sessions to be watched later on our YouTube channel." (Librarian in California serving both rural and suburban communities)

"We mostly created grab & go maker kits/activities for the kids. We would also hold outdoor programming when available." (Kit Developer in Rhode Island serving urban communities)

"We produced pre-recorded videos of 'Maker Moments', a biweekly how to video and accompanying PDF with details and budget for project. Sometimes, these Maker Moment videos had Take & Makes that patrons can pick up anytime and watch/do together on their own time." (Library Assistant in Colorado serving suburban communities)

"We transitioned our physical space offerings to a virtual format with a weekly blog posts, virtual programming, and videos promoting maker and STEAM activities for youth. Our adult makerspace opened for the first time in June 2021 and we provided self-directed learning opportunities from the get go." (Program Director & Librarian in Illinois serving suburban communities)

"I recorded some teaser videos used on our Facebook page and a few pre-recorded classes. I also built take-and-make kits for upcoming classes which I taught via Zoom every single Wednesday at 6pm CST, just like the classes when we were open. I required registration using eventbrite so that I could send the login information to the participants." (Administrator & Librarian in Texas serving urban communities)
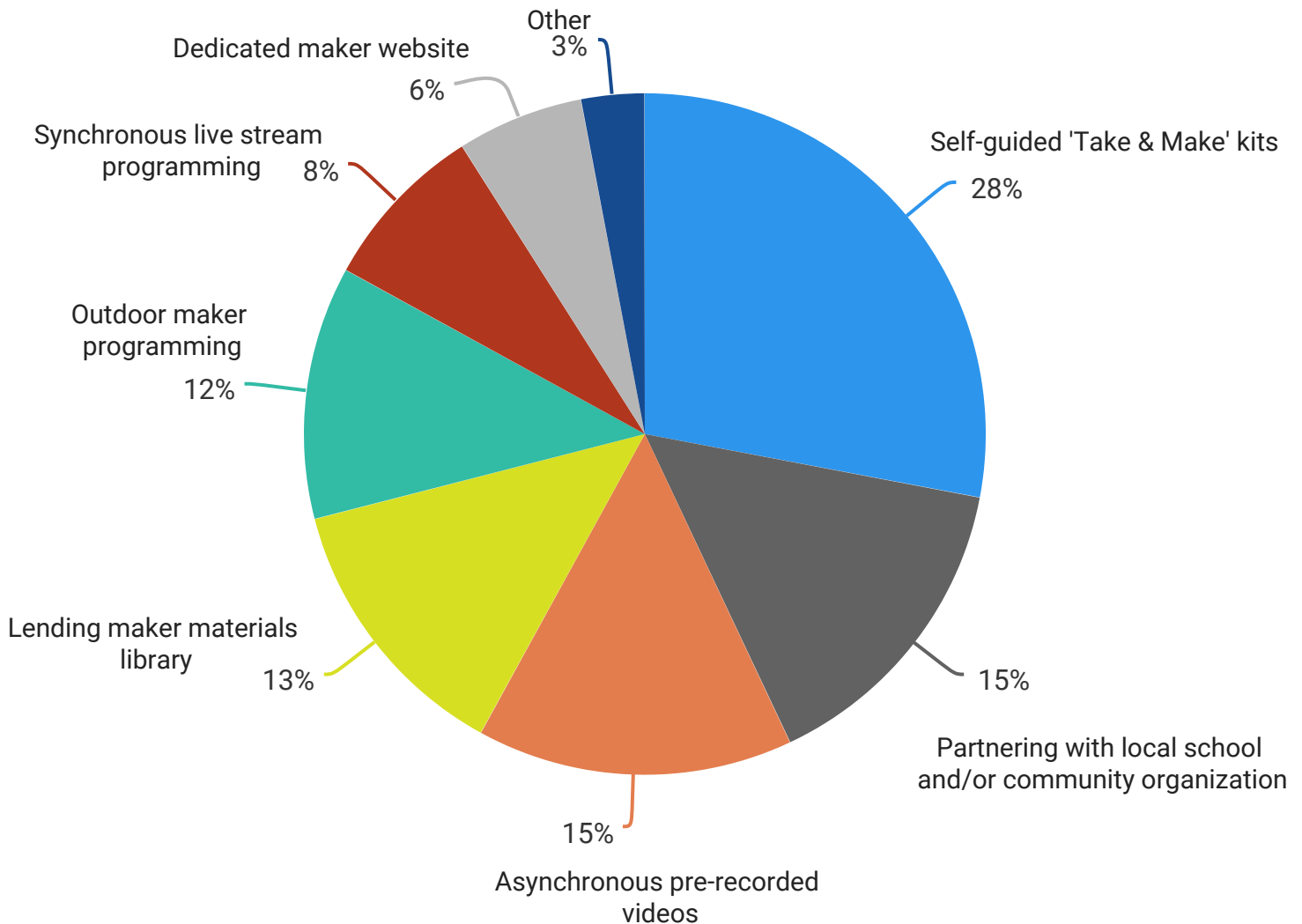
✓ Added Value & Continuation Post-Pandemic

The following program elements were selected as adding value to respondents' programs and will continue regardless of the state of the pandemic:

1. Self-guided "Take & Make" kits (28%),
2. Partnering with local schools and/or community organizations (15%),
3. Asynchronous pre-recorded videos (15%),
4. Lending maker materials library (13%),
5. Outdoor maker programming (12%),
6. Synchronous live stream programming (8%),
7. Dedicated maker website (6%),
8. 'Other' including running an indoor makerspace programs, holding dedicated Zoom programs in coordination with Take & Make kits, collaborating with teachers, equipment training, hybrid meetings, and maker activities offered through Beanstalk (3%; Figure 8).

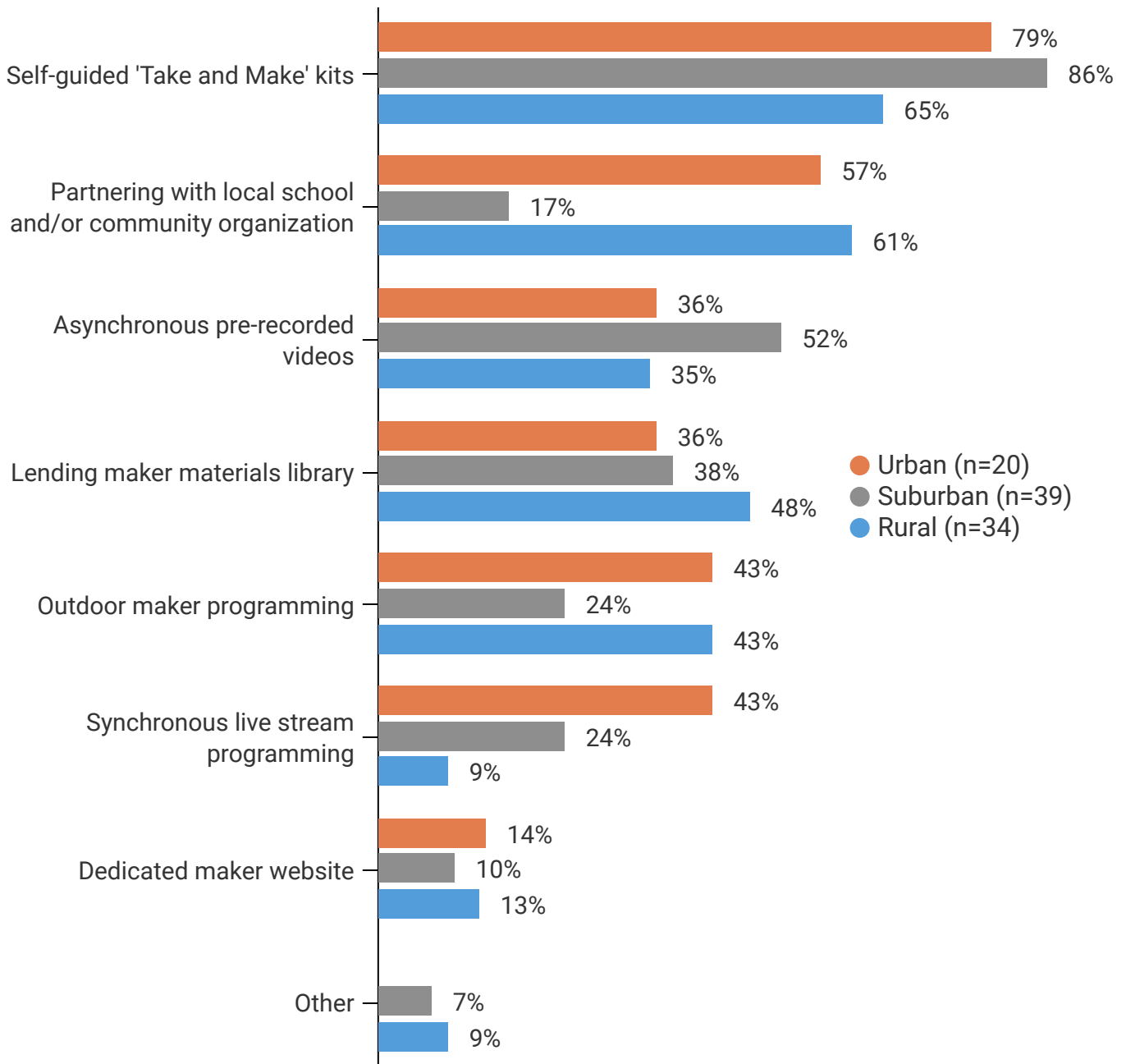**Figure 8a. Elements that added value and will continue post-pandemic**

Added Value & Continuation Post-Pandemic

When comparing which elements of their makerspace programming added value and will continue post-pandemic (by community type), rural communities selected partnering with local schools and community organizations, and lending maker materials library more so than respondents residing in urban and suburban communities. Rural communities rated outdoor maker programming as adding value to their programming, and an element that will continue, at the same rate as urban communities (both 43%). Utilizing synchronous live stream programming added the least value to respondents residing in rural communities.

Figure 8b. Elements that added value and will continue post-pandemic (BY COMMUNITY TYPE)

Self-guided 'Take and Make' kits — Urban 79%, Suburban 86%, Rural 65%
Partnering with local school and/or community organization — Urban 57%, Suburban 17%, Rural 61%
Asynchronous pre-recorded videos — Urban 36%, Suburban 52%, Rural 35%
Lending maker materials library — Urban 36%, Suburban 38%, Rural 48%
Outdoor maker programming — Urban 43%, Suburban 24%, Rural 43%
Synchronous live stream programming — Urban 43%, Suburban 24%, Rural 9%
Dedicated maker website — Urban 14%, Suburban 10%, Rural 13%
Other — Suburban 7%, Rural 9%

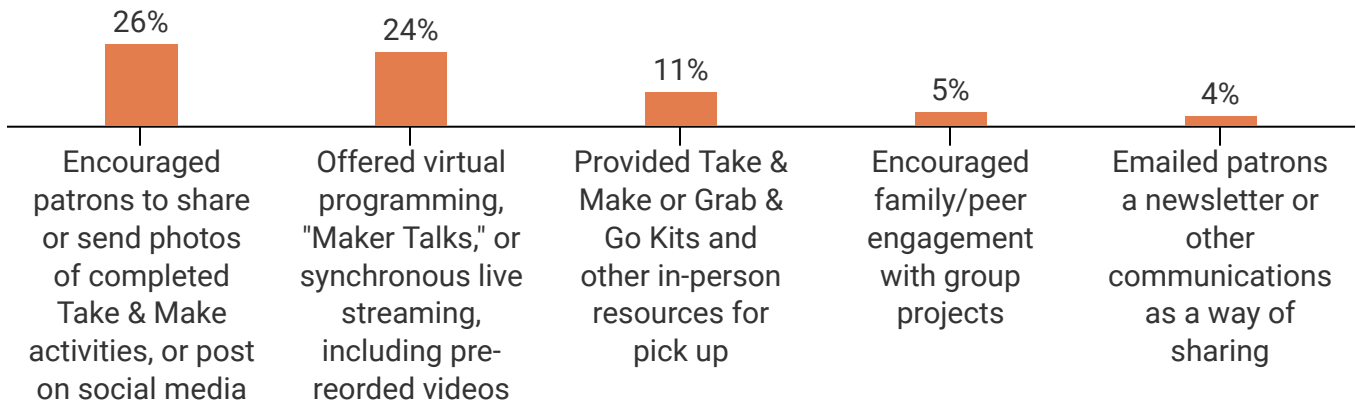Urban (n=20)
Suburban (n=39)
Rural (n=34)

How Libraries Encouraged Collaboration During COVID

The following is a summary of what we discovered about how libraries encouraged continued collaboration during the COVID-19 pandemic. Open ended responses to the previous question on ways of innovating on program delivery models during the pandemic were coded based on thematic similarities. The following chart represents thematic groupings by frequency of mention. Using Take & Make or Grab & Go Kits were cited most frequently, following by the production and creation of pre-recorded video that include instruction, program elements, and story time, which were also made available on their own website or on a social media platform.

Figure 9. How libraries encouraged collaboration during COVID

26%	24%	11%	5%	4%
Encouraged patrons to share or send photos of completed Take & Make activities, or post on social media	Offered virtual programming, "Maker Talks," or synchronous live streaming, including pre-reorded videos	Provided Take & Make or Grab & Go Kits and other in-person resources for pick up	Encouraged family/peer engagement with group projects	Emailed patrons a newsletter or other communications as a way of sharing

Other ways of encouraging collaboration during COVID, mentioned two or less times, were as follows:

Engagement

- Encouraged group projects
- Welcomed limited visits
- Recruited volunteers to help
- Collaborated with other libraries
- Engaged patrons electronically via newsletters and updates

Communication

- Communicated with patrons about resources available at home
- Engaged patrons electronically via newsletters and updates
- Asked patrons to provide feedback
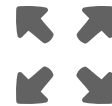
Expanded Program Features

- Provided 3D printer and materials to volunteers
- Integrated a "showcase" at the end of programming
- Held contests for take-home projects
- Offered digital badging system for patrons

Most successful program delivery models

Survey respondents described the maker program delivery models that were the most successful during the pandemic, in addition to the tools they used to determine that their program was a success. The most common theme that emerged pointed to the success of Take & Make or take-home kits; close to 40% of open-ended responses mentioned this particular program model as being successful, followed by virtual and synchronous live programming, in-person program (indoors or outdoors), and online pre-recorded videos. Other program delivery models mentioned less included 3D print labs or services, patrons using their own devices for activities or laptops at libraries and integrating reflective writing exercises and blogging as a way to share about the program and activities.

To measure the success of their program, respondents tended to use the number of kits distributed or picked up as an indicator, followed by surveys or feedback forms, the number of YouTube or online video views, anecdotal feedback, and attendance numbers as indicators (see list below for frequency/counts that represent number of times mentioned from open-ended responses). The following methods were used to measure program successes (in order from most mentioned to least mentioned):

1. Number of kits distributed or picked up
2. Survey feedback
3. Number of YouTube/online video views
4. Anecdotal feedback from patrons
5. Attendance or registration numbers from programs
6. Quiz scores during programming based on content covered
7. Virtual observations
8. Number of training sessions

"Maker programming that showcased participants creativity were most successful because it gave patrons an expressive outlet and a way to connect with community." (Librarian in California serving suburban communities)

"Make and Take bags have been a lot more successful than Zoom. We keep track of the number of kits we distribute as well as the number of people who do the Zoom classes. Snowbirds and seasonal visitors are most likely to use our Zoom programs." (Librarian in Florida serving urban and suburban communities)

"Kits were very successful based on the participants that picked up the kits and joined us as well as participant surveys would give us feedback." (Librarian in California serving urban communities)

"Our 3D print labs printed thousands of face shields and mask strap extenders for local health care providers, schools, businesses, and government workers, with the help of volunteers and staff." (Administrator in California serving rural communities)

"Maker programming where patrons could use their own devices (coding) were more successful than when we have patrons on-site at the library, pre-pandemic, using the library's laptops to code since the library had older laptops with long loading/processing times." (Librarian in California serving suburban communities)

"The outdoor, in-person programming [was most successful]. We are a very rural and poor community. Not many people have internet at home, so online events don't work well. They liked the in-person events." (Administrator & Librarian in Arkansas serving rural communities)

Least successful program delivery models

Respondents were asked to identify which programming and delivery models were least successful during the pandemic and reasons why, and reflect on which tools they used to determine the program were less successful. Asynchronous pre-recorded maker videos and classes, Zoom meetings (either due to limited internet access or "Zoom fatigue"), and live streaming program content were described as being the least successful with patrons (Figure 10). Additionally, it was challenging to teach teens and keep teens engaged, have multiple virtual courses more frequently (e.g., several virtual courses per week), and for some the Take & Make Kits were not as successful. Similar to measurements of program success, respondents referenced the low number of kits distributed or picked up, survey feedback, low number of views, and informal or anecdotal feedback as indicators for which program elements were not as successful. Open-ended comments below describe the challenge with Zoom/computer fatigue, limited internet access, and low attendance for in-person programming.

Figure 10. Least successful programming & delivery models (COUNTS OF RESPONSES)
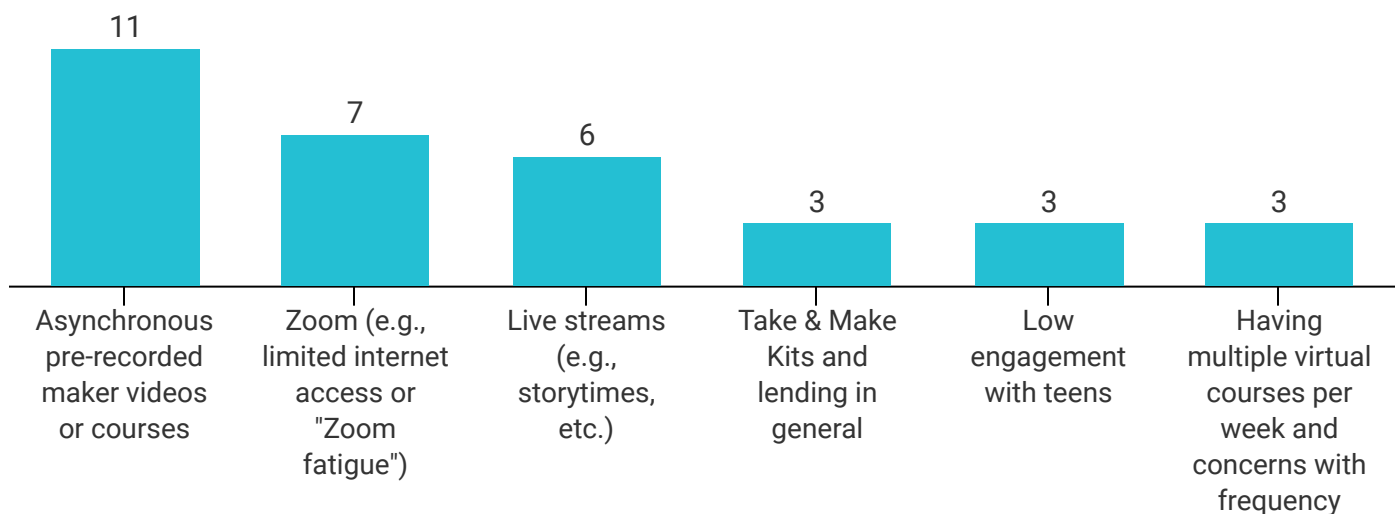
"Some of the Zoom programs have worked, but due to our population demographics and needs (many seniors, underserved populations without access to Internet, etc), they have been a real mixed bag. Zoom fatigue has been real, too." (Librarian in Florida serving urban and suburban communities)

"Our synchronous art programs for teens became less popular as more and more things opened up at the end of the pandemic. They were so sick of being on the computer." (Librarian in California serving rural and suburban communities)
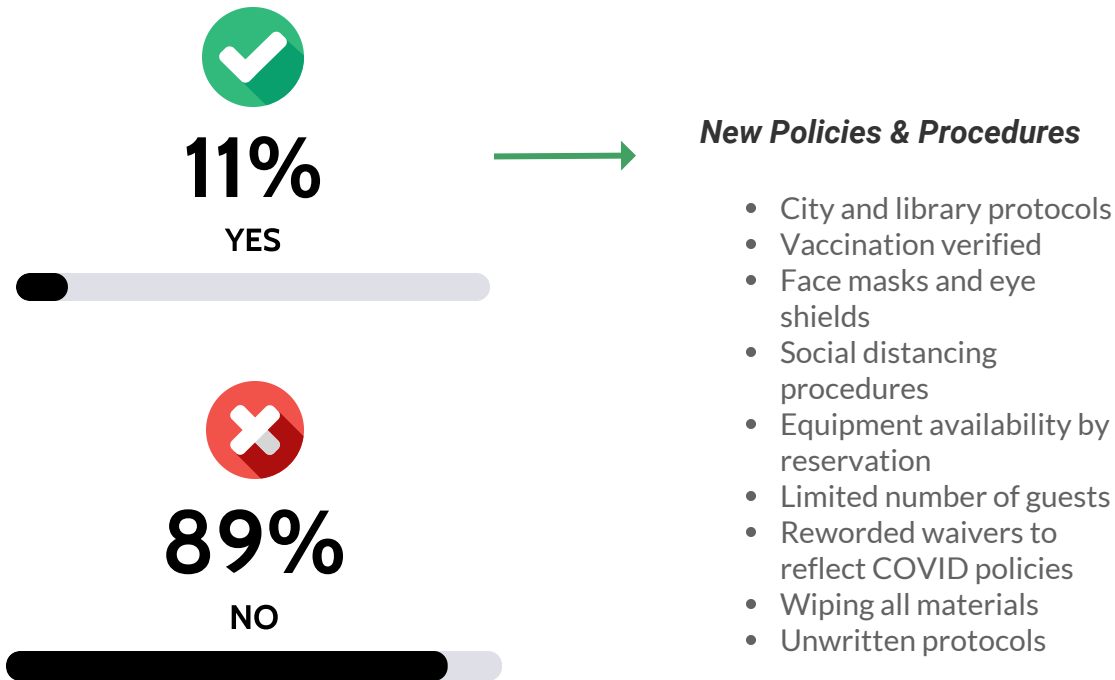
"Our online programs were not successful partly due to the lack of internet access, especially when we were closed." (Library Assistant in Arkansas serving rural communities)

"The least successful by numbers attended was the twice weekly STEM classes." (Library Assistant in Colorado serving rural and suburban communities)

New Policies & Procedures

Respondents were asked if their library developed any new policies, protocols (e.g., safety protocols), or procedures for their program as a result of the pandemic. The majority of respondents reported not adopting new policies, protocols or procedures as a result of the pandemic.

11%
YES

89%
NO

New Policies & Procedures

- City and library protocols
- Vaccination verified
- Face masks and eye shields
- Social distancing procedures
- Equipment availability by reservation
- Limited number of guests
- Reworded waivers to reflect COVID policies
- Wiping all materials
- Unwritten protocols

New Skills and Knowledge for Success

Survey respondents listed several skills needed to be successful during the pandemic, including (from most frequently mentioned to least):

- Technological skills related to videos (editing videos, recording videos, production)
- Learning about virtual platforms and how to livestream (e.g., Zoom, Facebook live)
- Flexibility & Adaptability
- Instructional and curriculum design for online implementation
- Communication skills (e.g., email, phone, webchat)
- Relationship skills
- Awareness of Zoom fatigue
- *Two or fewer mentions*: Knowledge of different devices used by students; Workarounds for parental restrictions on devices for websites; Ensuring devices have USB ports; Writing scripts; Reaching people where they are; How to use social media platforms and posting; Assembly line work; Health and safety protocols; Working in extreme temperatures; Being more detail oriented; Patience; Confidence; Creating virtual escape rooms; Webcams; Networking; Self-care.

Conclusion

The importance of these survey findings is abundant but can potentially be distilled into two pathways:

1. Makerspace programming and implementation practices fostered by librarians during the pandemic that proved to be more successful in reaching and engaging diverse communities, and
2. The gradual transition back to in-person makerspace programming and those practices and skills that librarians perceived to be critical and value-added in a post-pandemic environment.

Collectively, these findings provide a sense of implications that the pandemic imparted onto libraries when having to pivot to remote program delivery, then back to in-person. The pandemic encouraged library makerspace professionals to identify some of the key values of their makerspace and how their values aligned with, and often departed from, the many demands impacted by the pandemic. Forced to scale back or fully abandon in-person maker programming, librarians adopted new and innovative implementation methods and activity models more appropriate for virtual environments. Survey respondents described the new skills they had to learn in order to implement these programs successfully, and to determine which programming and delivery models worked best for their organization's capacity, while simultaneously meeting the needs of their local communities. These findings provide critical insights and guidance for librarians and library administrators to consider when planning for development and implementation of makerspace activities in a continually evolving post-pandemic hybrid environment.

![Rockman et al Research & Evaluation — An employee-owned company](logo)

This study was conducted by Rockman et al. Cooperative Inc. in collaboration with the Makers in the Library Group. For questions about this report, please contact Scott Burg. This project was made possible in part by the Institute of Museum and Library Services #RE-250100-OLS-21

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