# Braille and Born Digital Curriculum: Survey Results

These are the results of a survey sponsored by the National Instructional Materials Access Center (NIMAC), in collaboration with the National AEM Center at CAST. The goal of the survey was to gather information on how the transition to the use of digital materials in the classroom is affecting students who are braille readers, and the special challenges confronting these students.

The survey was widely distributed via a Survey Monkey link and was open from October 1, 2018 through November 1, 2018.

We extend our thanks to Dr. Jason Immekus at the University of Louisville for his gracious assistance in analyzing the data.

**1. What is your role in providing accessible materials to students?**
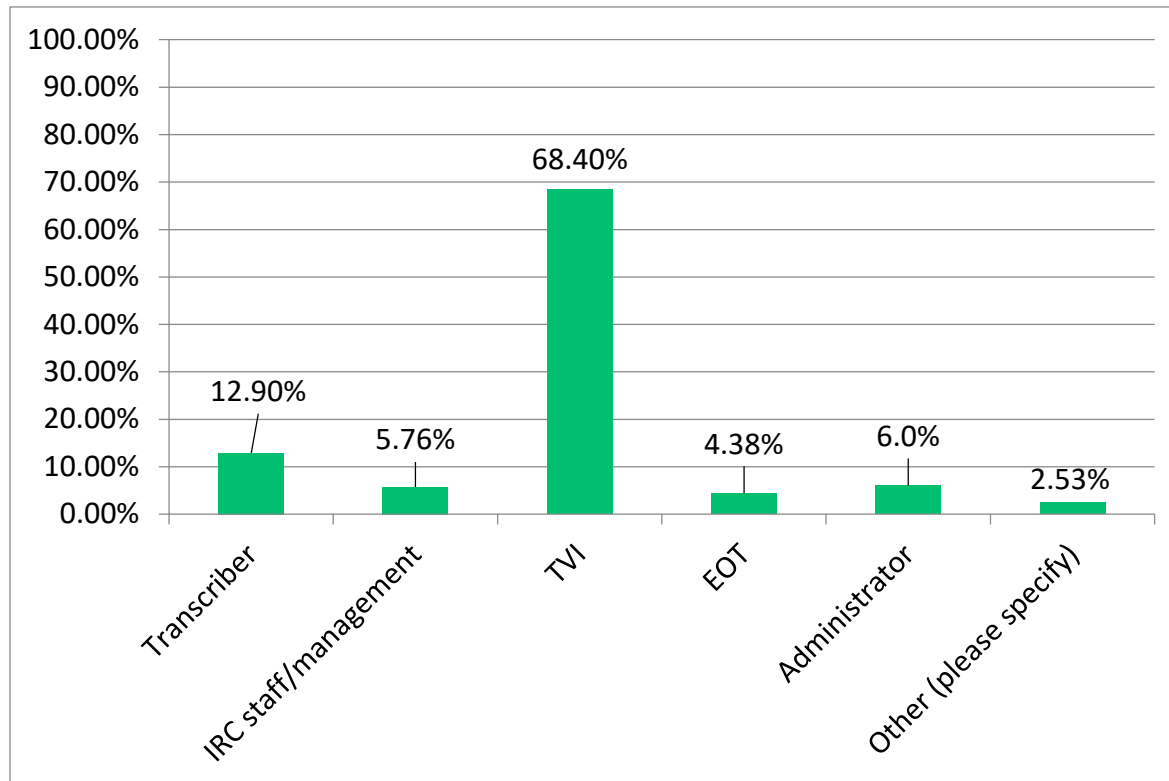
**Q1 Data**

| Answer Choices | Responses | |
|---|---|---|
| | % | *n* |
| Transcriber | 12.90% | 56 |
| IRC staff/management | 5.76% | 25 |
| TVI | 68.40% | 297 |
| EOT | 4.38% | 19 |
| Administrator | 6.0% | 26 |
| | 2.53% | 11 |
| **Answered** | | **434** |

**Observation:** Almost 70% of respondents were teachers of the visually impaired (TVIs) which is positive as these individuals have direct experience of the issues and challenges confronted by braille readers in the classroom.

## 2. What state/outlying area do you reside in?

**Q2 Data**

| Answer Choices | Responses | |
|---|---|---|
| Alabama | 0.46% | 2 |
| Alaska | 0.00% | 0 |
| American Samoa | 0.00% | 0 |
| Arizona | 2.53% | 11 |
| Arkansas | 1.38% | 6 |
| California | 2.30% | 10 |
| Colorado | 0.00% | 0 |
| Connecticut | 0.23% | 1 |

| | | |
|---|---|---|
| Delaware | 0.00% | 0 |
| District of Columbia (DC) | 0.00% | 0 |
| Florida | 2.30% | 10 |
| Georgia | 2.07% | 9 |
| Guam | 0.23% | 1 |
| Hawaii | 0.23% | 1 |
| Idaho | 0.23% | 1 |
| Illinois | 0.00% | 0 |
| Indiana | 4.15% | 18 |
| Iowa | 5.99% | 26 |
| Kansas | 1.84% | 8 |
| Kentucky | 10.37% | 45 |
| Louisiana | 1.15% | 5 |
| Maine | 0.92% | 4 |
| Maryland | 1.61% | 7 |
| Massachusetts | 6.68% | 29 |
| Michigan | 4.61% | 20 |
| Minnesota | 4.61% | 20 |
| Mississippi | 0.92% | 4 |
| Missouri | 1.61% | 7 |
| Montana | 0.92% | 4 |
| Nebraska | 3.92% | 17 |
| Nevada | 0.23% | 1 |
| New Hampshire | 0.69% | 3 |
| New Jersey | 0.69% | 3 |
| New Mexico | 3.46% | 15 |
| New York | 2.07% | 9 |
| North Carolina | 8.99% | 39 |
| North Dakota | 1.15% | 5 |
| Northern Mariana Islands | 0.00% | 0 |

| | | |
|---|---|---|
| Ohio | 0.46% | 2 |
| Oklahoma | 1.61% | 7 |
| Oregon | 0.69% | 3 |
| Pennsylvania | 0.69% | 3 |
| Puerto Rico | 0.00% | 0 |
| Rhode Island | 0.69% | 3 |
| South Carolina | 5.07% | 22 |
| South Dakota | 0.00% | 0 |
| Tennessee | 0.92% | 4 |
| Texas | 3.00% | 13 |
| US Virgin Islands | 0.00% | 0 |
| Utah | 0.69% | 3 |
| Vermont | 0.69% | 3 |
| Virginia | 0.69% | 3 |
| Washington | 5.30% | 23 |
| West Virginia | 0.00% | 0 |
| Wisconsin | 0.69% | 3 |
| Wyoming | 0.23% | 1 |

**Observation:** Surveys were submitted by respondents in 44 states, plus Guam. The six states with the highest participation were Kentucky, North Carolina, Massachusetts, Iowa, Washington, and South Carolina.

3. OERs (Open Educational Resources) are educational materials that are specifically designed by the authors to be made openly available. The licenses for these materials generally permit free use, modification, and redistribution of the content. The U.S. Department of Education's #GoOpen initiative supports States and districts choosing to transition to the use of openly licensed educational resources. **Is your state a "Go Open" state?**
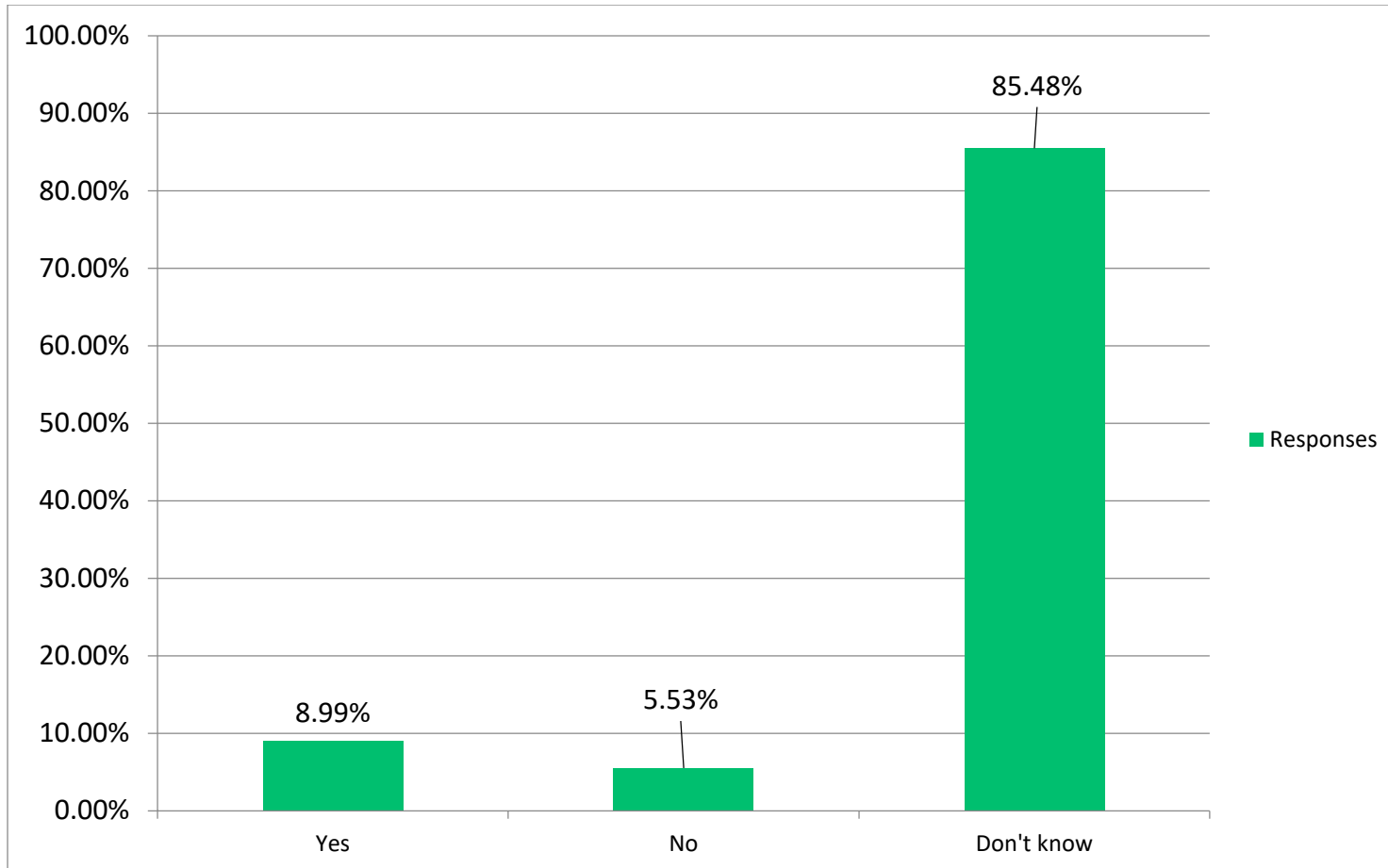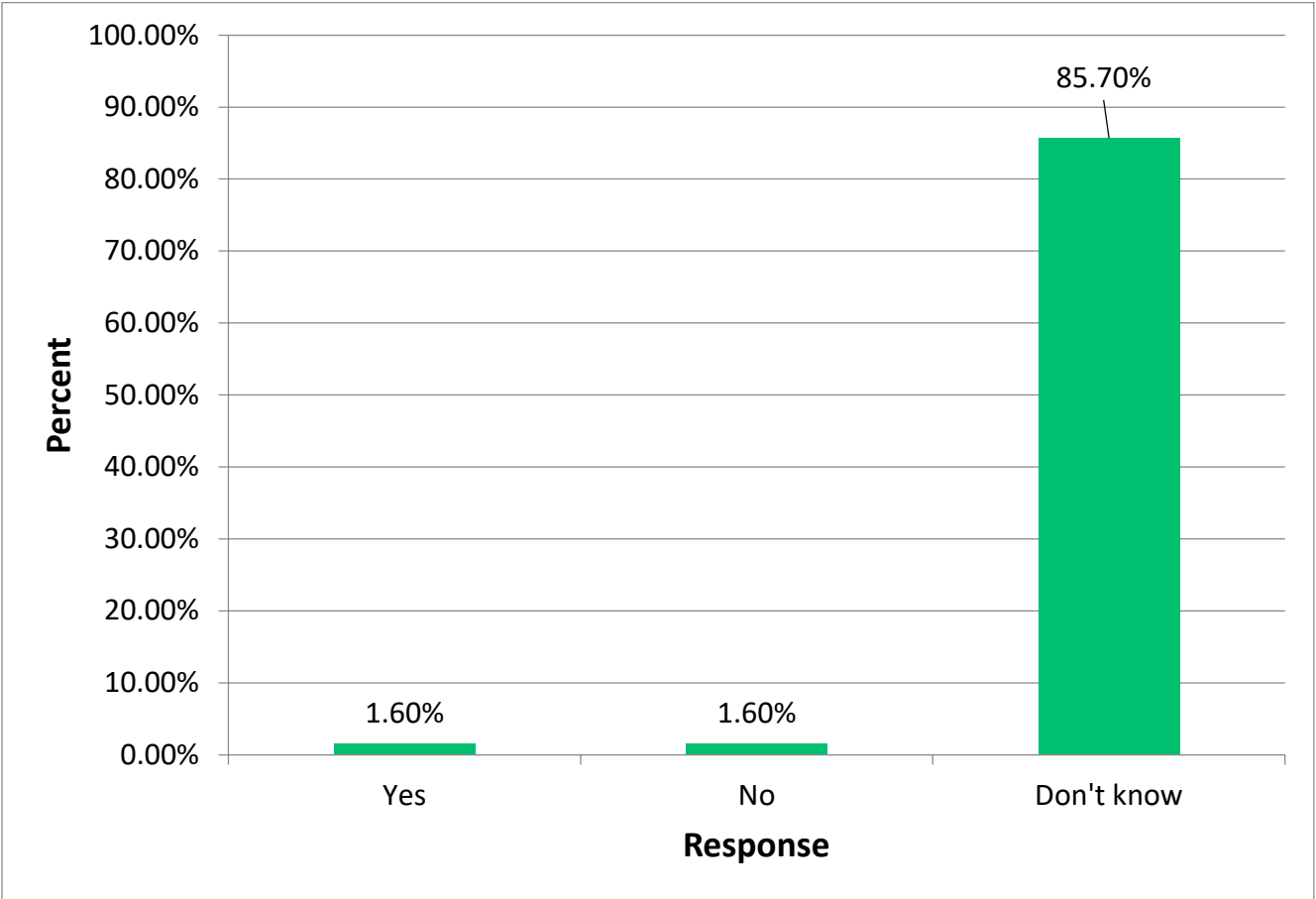
**Q3 Data**

| Answer Choices | Responses | |
|---|---|---|
| | % | n |
| Yes | 8.99% | 39 |
| No | 5.53% | 24 |
| Don't know | 85.48% | 371 |
| **Answered** | **434** | |
| **Skipped** | **0** | |

**Observation:** While 9% of respondents reported that their state was "Go Open," and 5.5% reported that their state was not, over 85% did not know.

**4. If the answer to Q3 is "No," is there a movement in your state to become a "Go Open" state?**
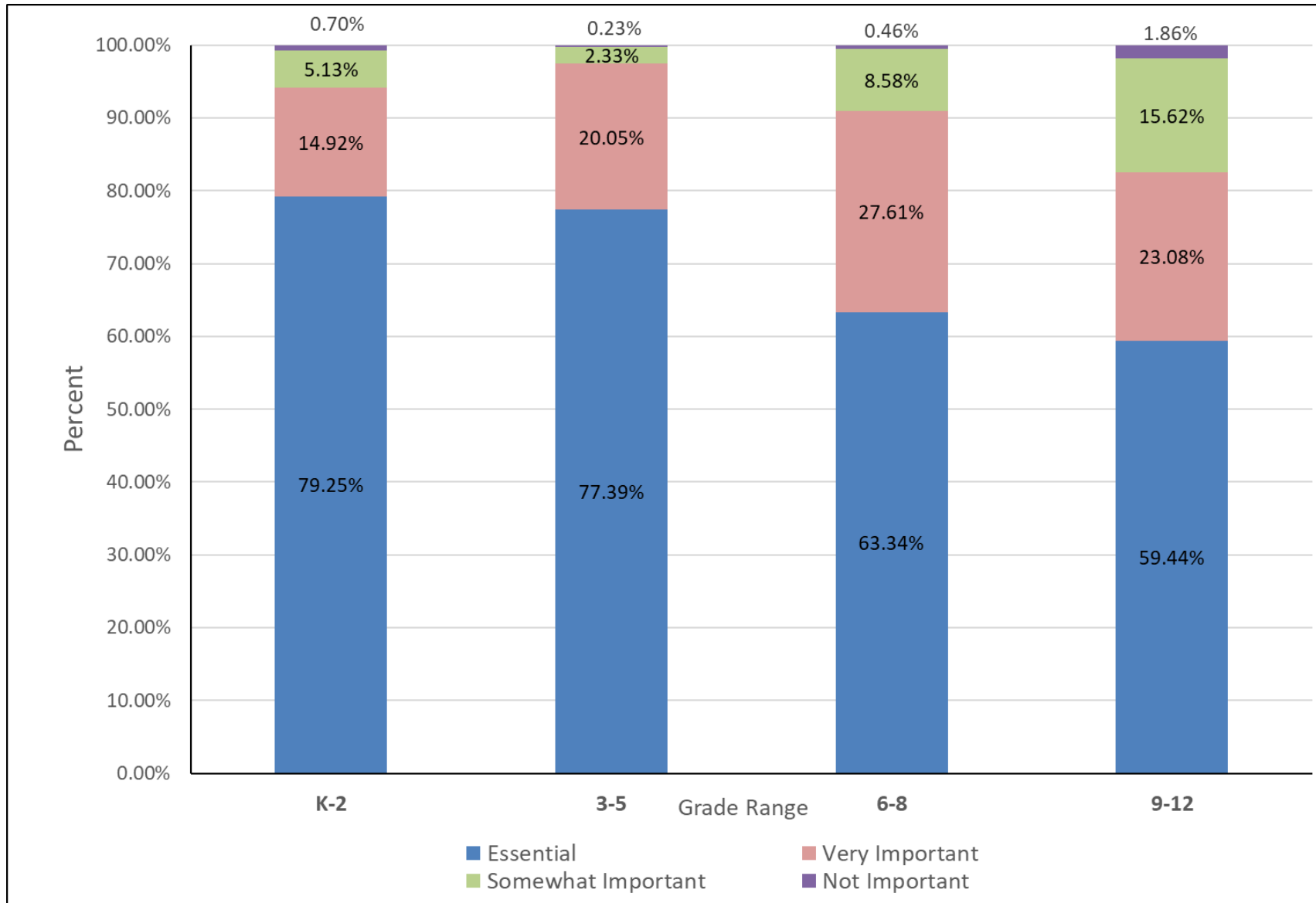
**Q4 Data**

| Answer Choices | Responses | |
|---|---:|---:|
| | % | *n* |
| Yes | 1.60% | 7 |
| No | 1.60% | 7 |
| Don't know | 85.70% | 372 |
| **Answered** | | **386** |
| **Skipped** | | **48** |

**Observation:** As with Q3, the vast majority of respondents (almost 86%) did not know whether there was a move toward becoming "Go Open" in their state.

**5. How important is embossed braille for the grade ranges below?**



| Grade Range | Essential | Very Important | Somewhat Important | Not Important |
|---|---|---|---|---|
| K-2 | 79.25% | 14.92% | 5.13% | 0.70% |
| 3-5 | 77.39% | 20.05% | 2.33% | 0.23% |
| 6-8 | 63.34% | 27.61% | 8.58% | 0.46% |
| 9-12 | 59.44% | 23.08% | 15.62% | 1.86% |

Legend: ■ Essential ■ Very Important ■ Somewhat Important ■ Not Important

**Q5 Data**

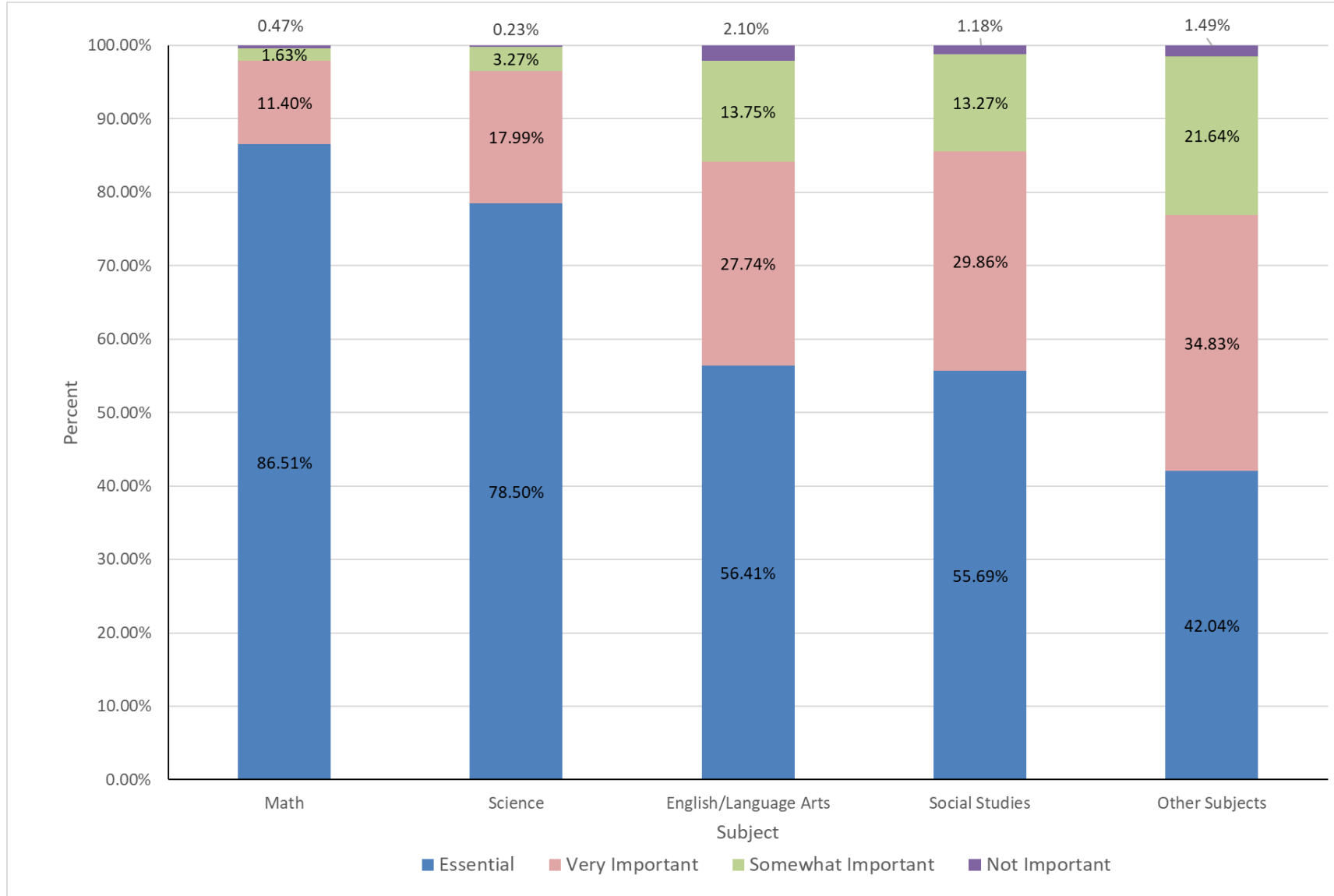| | Essential | | Very important | | Somewhat important | | Not important | |
|---|---|---|---|---|---|---|---|---|
| | % | n | % | n | % | n | % | n |
| K-2 | 79.25% | 340 | 14.92% | 64 | 5.13% | 22 | 0.70% | 3 |
| 3-5 | 77.39% | 332 | 20.05% | 86 | 2.33% | 10 | 0.23% | 1 |
| 6-8 | 63.34% | 273 | 27.61% | 119 | 8.58% | 37 | 0.46% | 2 |
| 9-12 | 59.44% | 255 | 23.08% | 99 | 15.62% | 67 | 1.86% | 8 |

**Answered 434**
**Skipped 0**

**Observations:**

- A majority of respondents rated the importance of embossed braille as "Essential" for all K-12 grades.
- The percentage of respondents rating its importance as either "Essential" or "Very Important" was 94% for grades K-2, 97% for grades 3-5, 91% for grades 6-8, and 83% for grades 9-12.
- Less than 1% of respondents rated embossed braille as "Not important" for any grade range before high school, and less than 2% of respondents rated it as "Not important" for high school grades.

## 6. How important is embossed braille for the subjects below?



Chart: Percent (y-axis) vs Subject (x-axis). Stacked bar chart with categories Essential, Very Important, Somewhat Important, Not Important.

| Subject | Essential | Very Important | Somewhat Important | Not Important |
|---|---|---|---|---|
| Math | 86.51% | 11.40% | 1.63% | 0.47% |
| Science | 78.50% | 17.99% | 3.27% | 0.23% |
| English/Language Arts | 56.41% | 27.74% | 13.75% | 2.10% |
| Social Studies | 55.69% | 29.86% | 13.27% | 1.18% |
| Other Subjects | 42.04% | 34.83% | 21.64% | 1.49% |

**NiMAC** National Instructional Materials Access Center

nimac@aph.org / 877-526-4622

**Q6 Data**

| | Essential | | Very important | | Somewhat important | | Not important | |
|---|---|---|---|---|---|---|---|---|
| | % | n | % | n | % | n | % | n |
| Math | 86.51% | 372 | 11.40% | 49 | 1.63% | 7 | 0.47% | 2 |
| Science | 78.50% | 336 | 17.99% | 77 | 3.27% | 14 | 0.23% | 1 |
| English/Language Arts | 56.41% | 242 | 27.74% | 119 | 13.75% | 59 | 2.10% | 9 |
| Social Studies | 55.69% | 235 | 29.86% | 126 | 13.27% | 56 | 1.18% | 5 |
| Other Subjects | 42.04% | 169 | 34.83% | 140 | 21.64% | 87 | 1.49% | 6 |

**Observations:**

- Embossed braille was rated as Essential for Math by almost 87% of respondents, and 98% rated it as either Essential or Very important.
- Embossed braille was rated as Essential for Science by 78.5% of respondents, and as either Essential or Very important by over 96% of respondents.
- A majority of respondents also rated embossed braille as Essential for English/Language Arts and for Social Studies.
- 84% of respondents rated embossed braille as Essential or Very Important for English/Language Arts, while 85.5% rated it as Essential or Very Important for Social Studies.

**7. What types of digital content are being used in your students' classrooms? (Choose all that apply.)**

**Types of Digital Content Used in the Classroom**

| Category | Percentage |
|---|---|
| Digital materials in a Learning Management System | 60.37% |
| Teacher-created digital content | 74.65% |
| Computer games/apps | 67.97% |
| Videos | 65.67% |
| Open Educational Resources (OERs) | 20.28% |
| Free content found online | 71.89% |
| Don't know | 8.29% |
| Other (please specify) | 10.14% |
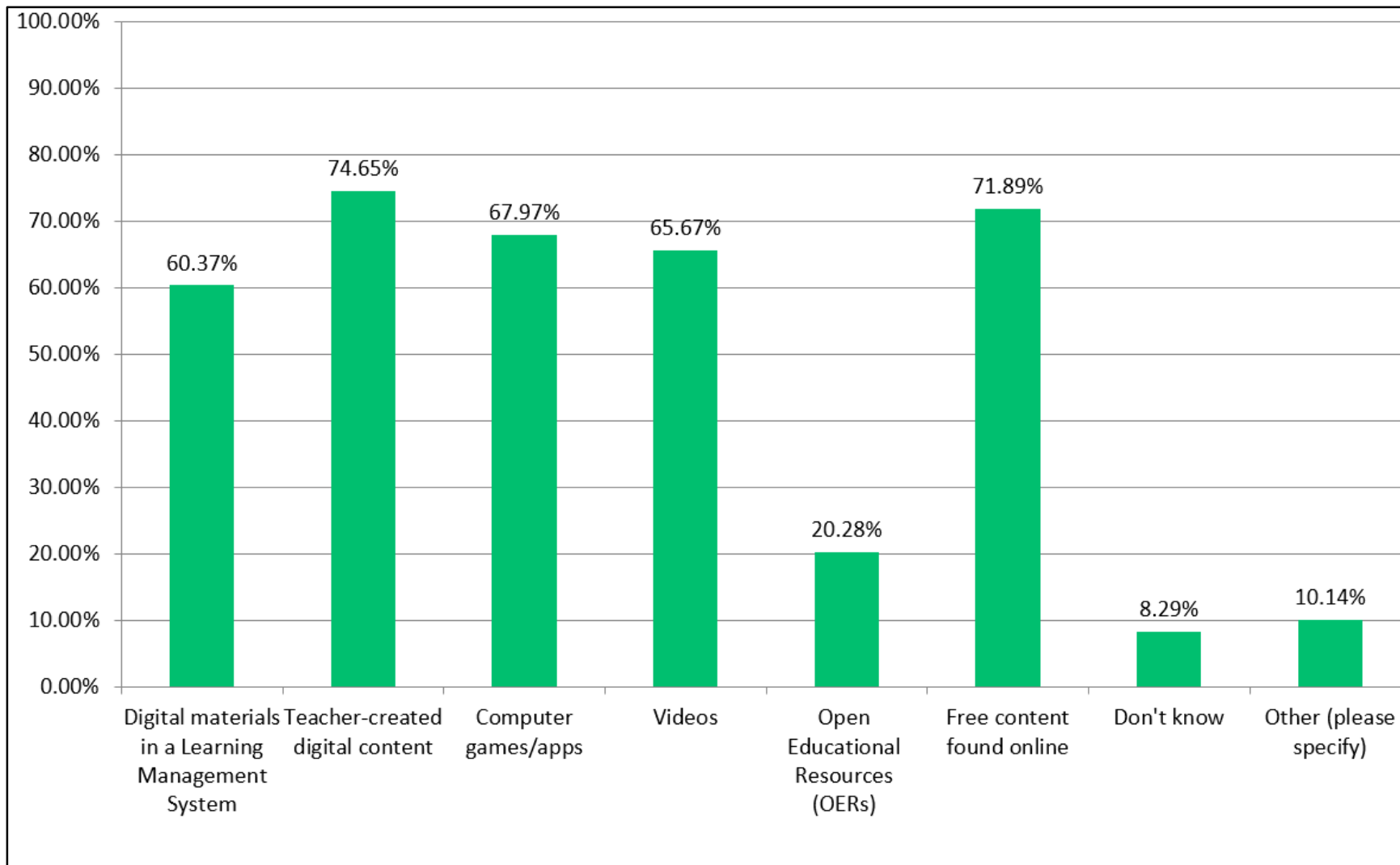
**Q7 Data**

| Answer Choices | Responses | |
|---|---|---|
| | % | n |
| Digital materials in a Learning Management System | 60.37% | 262 |
| Teacher-created digital content | 74.65% | 324 |
| Computer games/apps | 67.97% | 295 |
| Videos | 65.67% | 285 |
| Open Educational Resources (OERs) | 20.28% | 88 |
| Free content found online | 71.89% | 312 |
| Don't know | 8.29% | 36 |
| Other (please specify) | 10.14% | 44 |

**Observations:**

- A high majority of respondents reported the use of all types of digital materials except OERs.
- The most commonly used materials were teacher-created digital content (74.65%) and free content found online (71.89%).
- Computer games/apps and videos also rated very high, with 67.97% and 65.67% of respondents reporting their use, respectively.

**8. In your estimate, what percentage of schools in your state are using SOME digital content in the classroom?**

In your estimate, what percentage of schools in your state are using SOME digital content in the classroom?
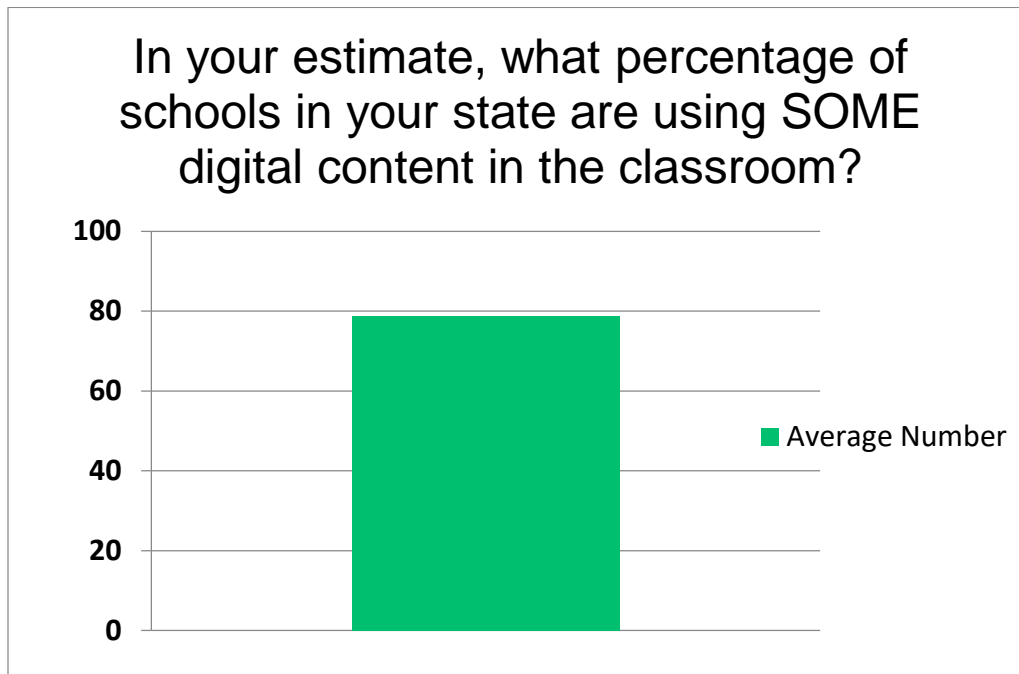


**Q8 Data**

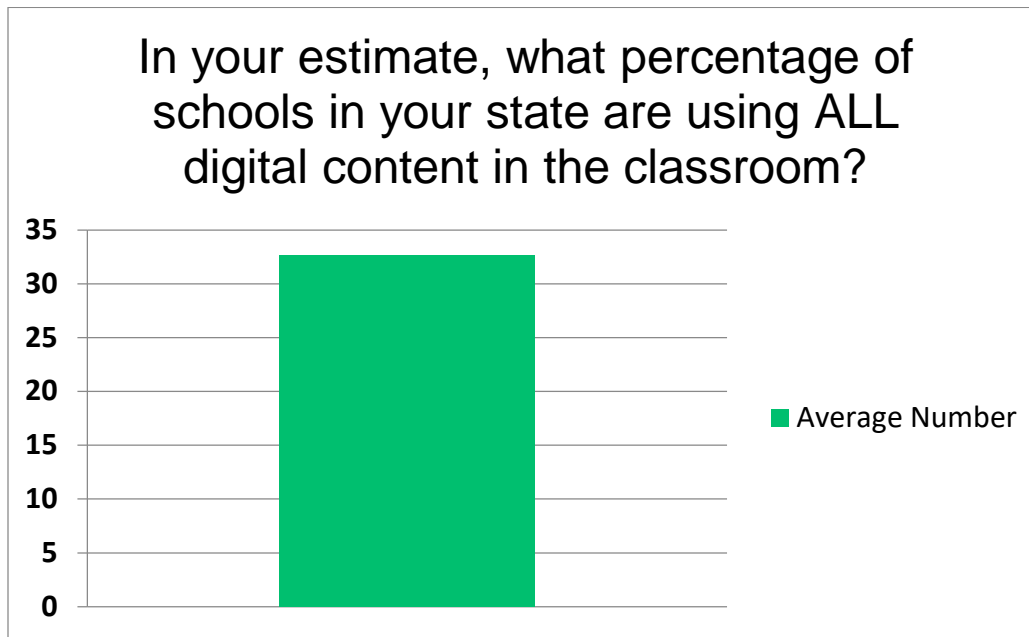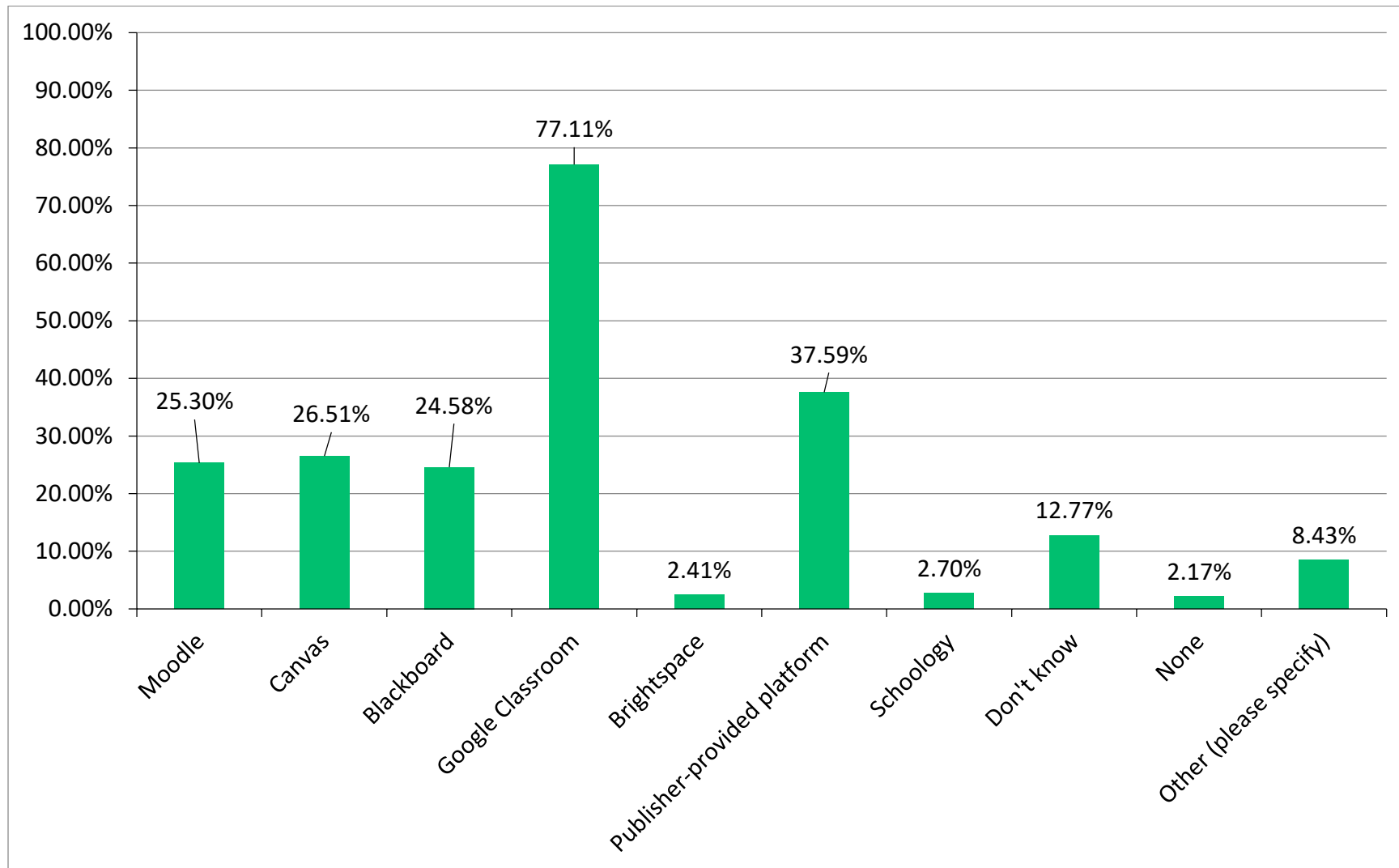| Average Number | Responses (*n*) |
|---|---|
| 78.8 | 434 |

| | |
|---|---|
| **Answered** | **434** |
| **Skipped** | **0** |

**Observation:** The average of responses was 78.8%. This indicates that the average respondent estimated that almost four out of five schools in their state are using some digital content in the classroom.

**9. In your estimate, what percentage of schools in your state are using ALL digital content in the classroom?**



In your estimate, what percentage of schools in your state are using ALL digital content in the classroom?

■ Average Number

**Q9 Data**

| Average Number | Responses (*n*) |
|---|---|
| 32.6 | 434 |

| | |
|---|---|
| **Answered** | **434** |
| **Skipped** | **0** |

**Observation**: While respondents' average estimate was that 80% of schools in their state were using some digital material, the estimate for the percentage of schools using all digital content was about 33%, or a third, of schools.

10. **Which online learning platform(s) or Learning Management System (LMS) does your state or district use? (Choose all that apply.)**



Chart data:
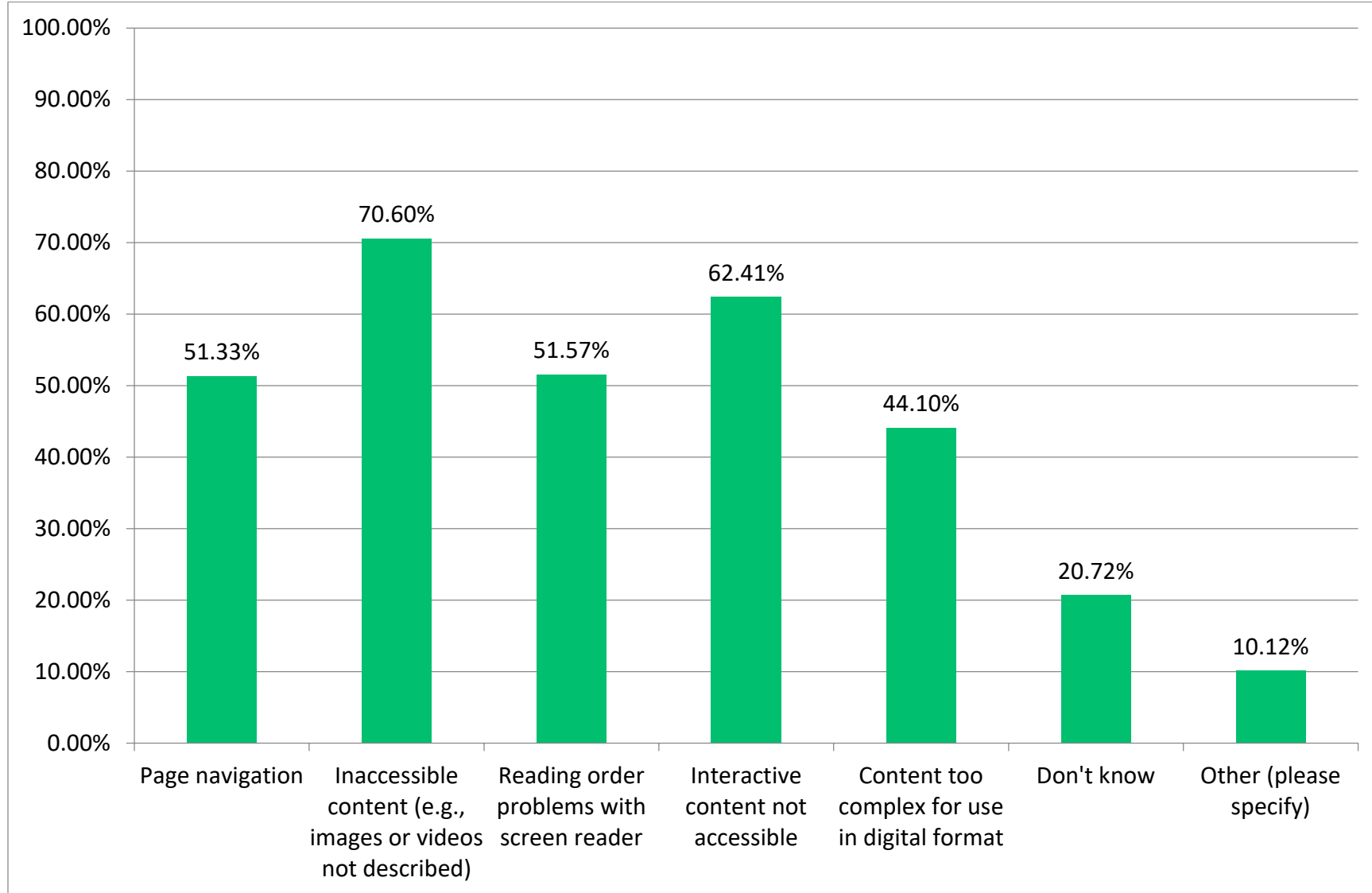- Moodle: 25.30%
- Canvas: 26.51%
- Blackboard: 24.58%
- Google Classroom: 77.11%
- Brightspace: 2.41%
- Publisher-provided platform: 37.59%
- Schoology: 2.70%
- Don't know: 12.77%
- None: 2.17%
- Other (please specify): 8.43%

**Q10 Data**

| Platform/LMS | % | Responses (*n*) |
|---|---|---|
| Moodle | 25.30% | 105 |
| Canvas | 26.51% | 110 |
| Blackboard | 24.58% | 102 |
| Google Classroom | 77.11% | 320 |
| Brightspace | 2.41% | 10 |
| Publisher-provided platform | 37.59% | 156 |
| Schoology | 2.70% | 12 |
| Don't know | 12.77% | 53 |
| None | 2.17% | 9 |
| Other (please specify) | 8.43% | 35 |
| **Answered** | | **415** |
| **Skipped** | | **19** |

**Observation:** Google Classroom was by far the most commonly reported platform used, having more than twice the number of responses than the next highest response (publisher-provided platform).

**11. What difficulties, if any, have your students encountered in using the Learning Management System (LMS)? (Choose all that apply.)**

Bar chart showing percentages for each difficulty category:

| Difficulty | Percentage |
|---|---|
| Page navigation | 51.33% |
| Inaccessible content (e.g., images or videos not described) | 70.60% |
| Reading order problems with screen reader | 51.57% |
| Interactive content not accessible | 62.41% |
| Content too complex for use in digital format | 44.10% |
| Don't know | 20.72% |
| Other (please specify) | 10.12% |

**Q11 Data**

| Answer Choices | Responses | |
|---|---|---|
| | % | n |
| Page navigation | 51.33% | 213 |
| Inaccessible content (e.g., images or videos not described) | 70.60% | 293 |
| Reading order problems with screen reader | 51.57% | 214 |
| Interactive content not accessible | 62.41% | 259 |
| Content too complex for use in digital format | 44.10% | 183 |
| Don't know | 20.72% | 86 |
| Other (please specify) | 10.12% | 42 |
| **Answered** | | **415** |
| **Skipped** | | **19** |

**Observation**: 70.6% of respondents reported problems with inaccessible content, while the next most common problem was interactive content not being accessible (62.41%).

**12. Are your schools using Open Educational Resources?**
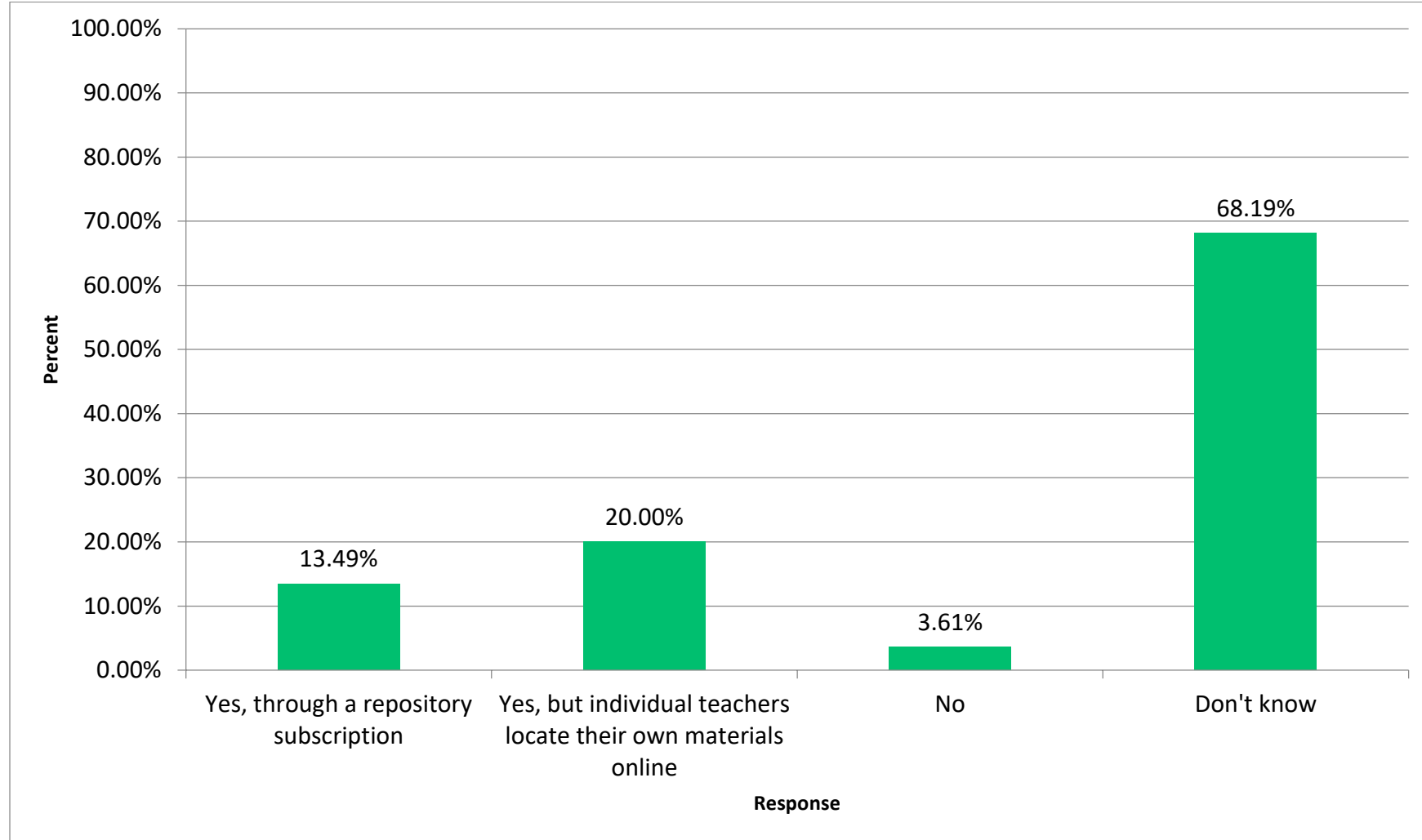
**Q12 Data**

| Answer Choices | Responses | |
|---|---|---|
| | % | *n* |
| Yes, through a repository subscription | 13.49% | 56 |
| Yes, but individual teachers locate their own materials online | 20.00% | 83 |
| No | 3.61% | 15 |
| Don't know | 68.19% | 283 |
| | **Answered** | **415** |
| | **Skipped** | **19** |

**Observation:** Over 68% of respondents did not know if their schools were using OERs. Considering that a strong majority of respondents on Q7 indicated that teachers were using free content found online (71.89%), the high rate of "Don't know" responses to Q12 could partly be due to a lack of familiarity with the term "Open Educational Resources."

**13. If your schools are using teacher-created content, what formats are being supplied/provided to students? (Choose all that apply.)**



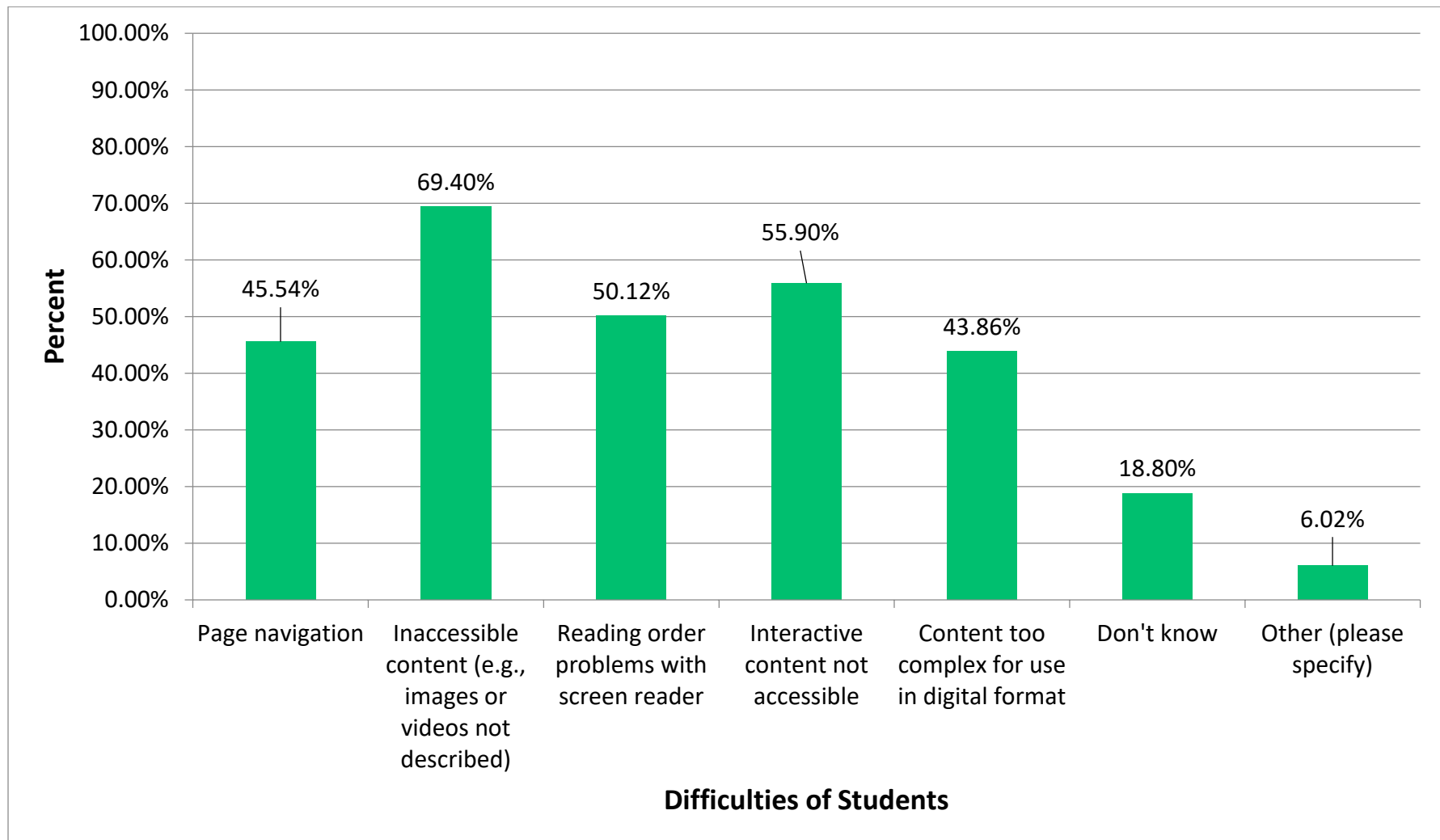A bar chart titled axis "Percent" (y-axis) and "Type of Content/Format" (x-axis):

- Word: 78.55%
- PDF: 70.84%
- HTML: 25.30%
- Google Docs/Slides/Sheets: 78.07%
- Pages: 18.80%
- Keynote: 9.40%
- Numbers: 5.30%
- YouTube videos: 60.00%
- Excel: 36.87%
- PowerPoint: 65.54%
- Don't know: 10.12%
- Other (please specify): 5.78%
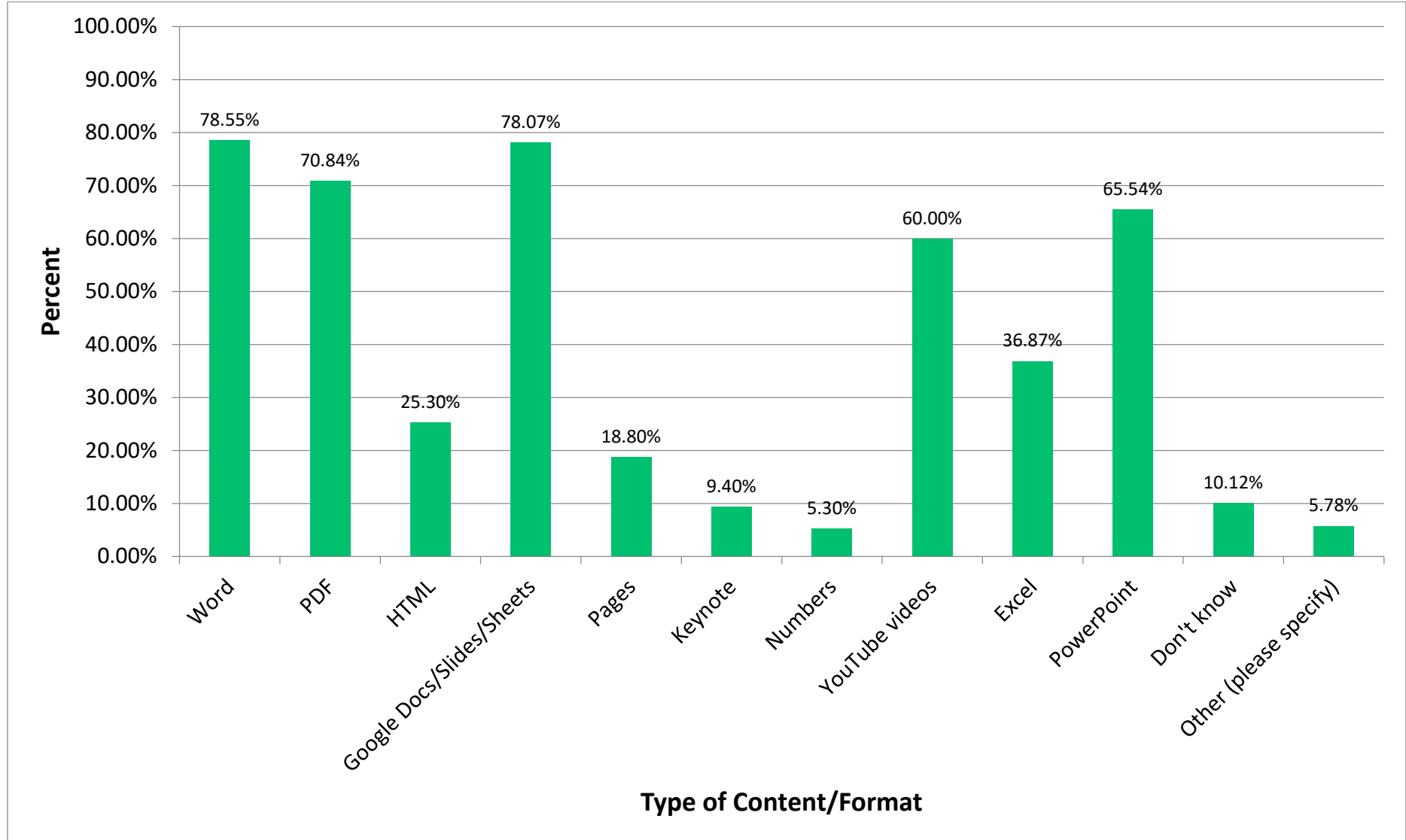
**Q13 Data**

| Answer Choices | Responses | |
|---|---|---|
| | % | *n* |
| Word | 78.55% | 326 |
| PDF | 70.84% | 294 |
| HTML | 25.30% | 105 |
| Google Docs/Slides/Sheets | 78.07% | 324 |
| Pages | 18.80% | 78 |
| Keynote | 9.40% | 39 |
| Numbers | 5.30% | 22 |
| YouTube videos | 60.00% | 249 |
| Excel | 36.87% | 153 |
| PowerPoint | 65.54% | 272 |
| Don't know | 10.12% | 42 |
| Other (please specify) | 5.78% | 24 |
| | **Answered** | **415** |
| | **Skipped** | **19** |

**Observations:**

- Word format and Google Docs/Slides/Sheets were reported as being used in the classroom by over 78% of respondents, closely followed by PDF format, with 70.8%, and PowerPoint, with 65.5%.
- YouTube videos were also very common, with 60% of respondents reporting their use.

**14. What difficulties, if any, have your students encountered in using teacher-created materials or open educational resources? (Choose all that apply.)**



Bar chart titled "Difficulties of Students" with Percent on the y-axis (0.00% to 100.00%):

- Page navigation: 45.54%
- Inaccessible content (e.g., images or videos not described): 69.40%
- Reading order problems with screen reader: 50.12%
- Interactive content not accessible: 55.90%
- Content too complex for use in digital format: 43.86%
- Don't know: 18.80%
- Other (please specify): 6.02%

**Q14 Data**

| Answer Choices | Responses | |
|---|---|---|
| | % | *n* |
| Page navigation | 45.54% | 189 |
| Inaccessible content (e.g., images or videos not described) | 69.40% | 288 |
| Reading order problems with screen reader | 50.12% | 208 |
| Interactive content not accessible | 55.90% | 232 |
| Content too complex for use in digital format | 43.86% | 182 |
| Don't know | 18.80% | 78 |
| Other (please specify) | 6.02% | 25 |
| | **Answered** | **415** |
| | **Skipped** | **19** |

**Observation:** The top three issues reported in using teacher-created digital materials and OERs were inaccessible content (69.4%), interactive content not accessible (55.9%) and reading order problems with screen reader (50.12%).

**15. How are you/your schools currently meeting the need for braille for born digital content? (Choose all that apply.)**
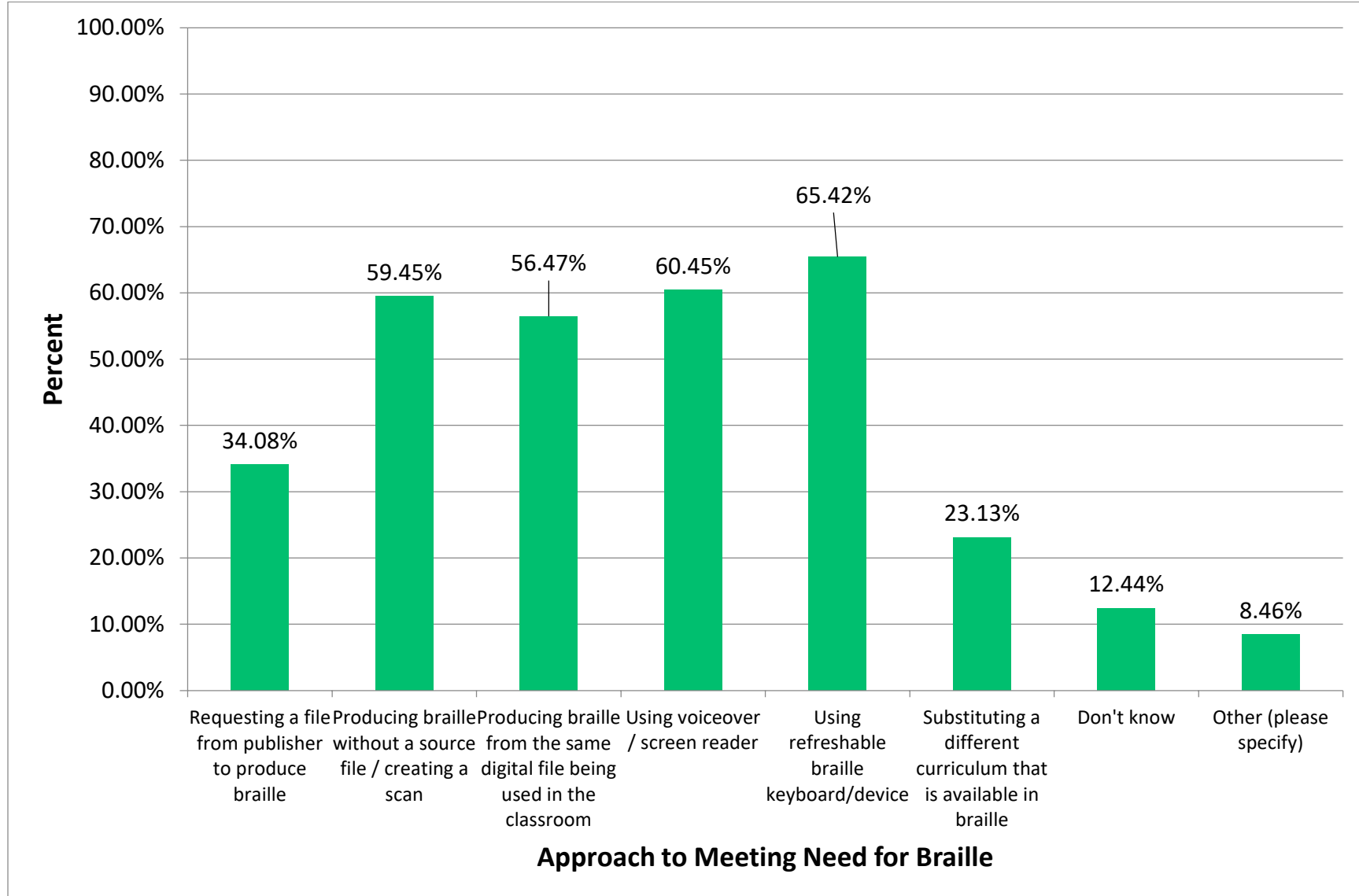
**Q15 Data**

| Answer Choices | Responses | |
|---|---|---|
| | *%* | *n* |
| Requesting a file from publisher to produce braille | 34.08% | 137 |
| Producing braille without a source file / creating a scan | 59.45% | 239 |
| Producing braille from the same digital file being used in the classroom | 56.47% | 227 |
| Using voiceover / screen reader | 60.45% | 243 |
| Using refreshable braille keyboard/device | 65.42% | 263 |
| Substituting a different curriculum that is available in braille | 23.13% | 93 |
| Don't know | 12.44% | 50 |
| Other (please specify) | 8.46% | 34 |
| | **Answered** | **402** |
| | **Skipped** | **32** |

**Observations:**

- The top two responses for meeting the need for braille for digital content were using a refreshable keyboard/device (65.42%) and using voiceover/screen reader (60.45%).
- These were followed closely by producing braille without a source file/creating a scan (59.45%) and producing braille from the same digital file being used in the classroom (56.47%). These results indicate that a significant number of schools are producing braille for digital content, whether a source file is available or not.

**16. If you have reached out to a publisher to obtain a source file to produce braille for a digital curriculum, what file format(s) were you able to obtain? (Choose all that apply.)**



Chart — Percent (y-axis) vs File Format (x-axis):

- PDF: 25.37%
- Word: 13.93%
- ASCII (or other text file): 3.73%
- HTML: 5.47%
- EPUB: 9.20%
- NIMAS: 18.41%
- I tried to obtain a source file but was not successful.: 16.17%
- I have not tried to obtain a source file.: 55.47%
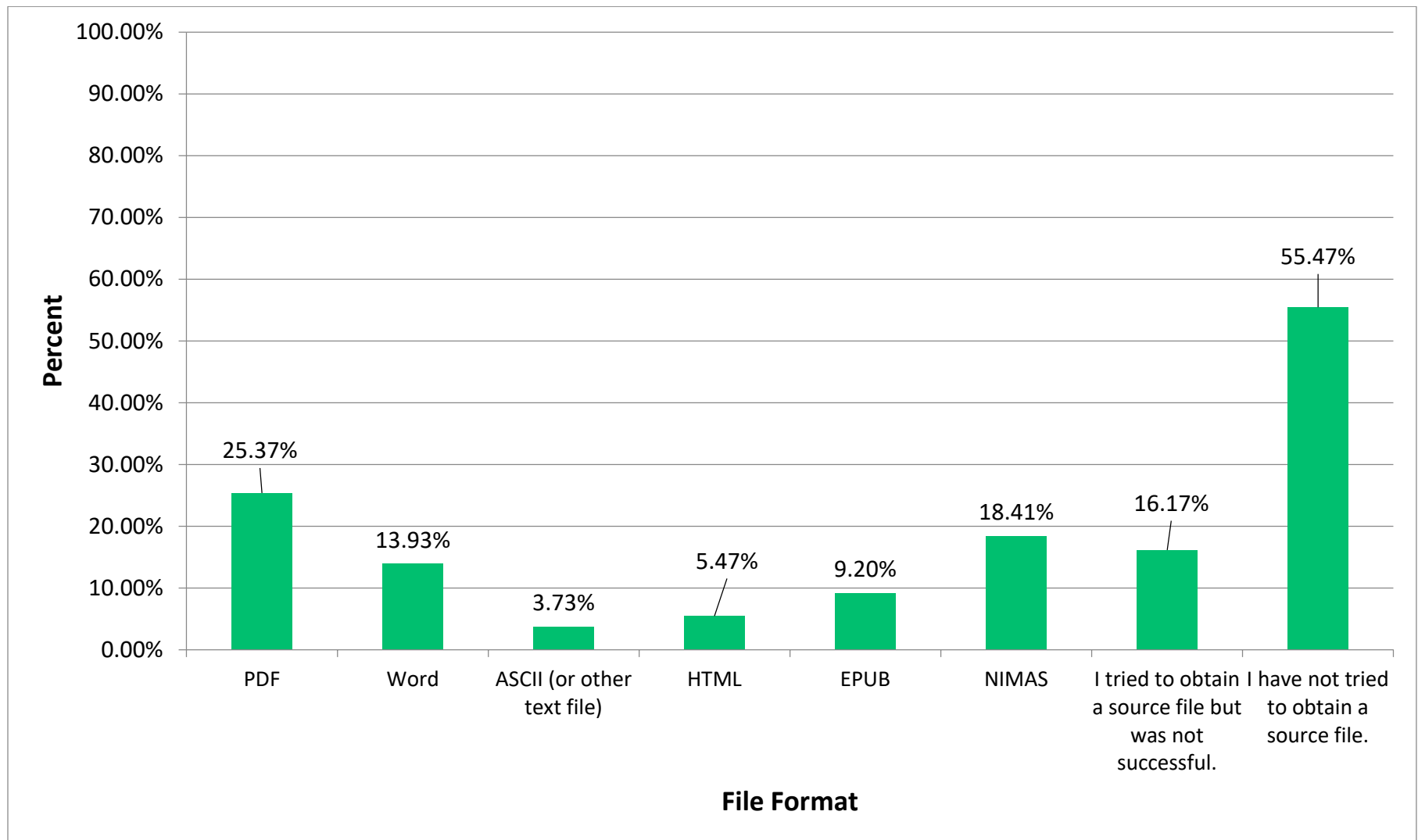
**Q16 Data**

| Answer Choices | Responses | |
|---|---|---|
| | % | n |
| PDF | 25.37% | 102 |
| Word | 13.93% | 56 |
| ASCII (or other text file) | 3.73% | 15 |
| HTML | 5.47% | 22 |
| EPUB | 9.20% | 37 |
| NIMAS | 18.41% | 74 |
| I tried to obtain a source file but was not successful. | 16.17% | 65 |
| I have not tried to obtain a source file. | 55.47% | 223 |
| | **Answered** | **402** |
| | **Skipped** | **32** |

**Observations:**

- The majority of respondents (55.47%) had not attempted to obtain a source file from a publisher in order to create braille for digital content.
- About one in four respondents (25.37%), however, had successfully obtained PDF from a publisher.
- A significant percentage (18.41%) reported having obtained NIMAS from the publisher.
    - This is an interesting finding, as digital instructional materials are currently exempt from federal NIMAS requirements.
    - To date, the NIMAC is not aware of any publisher providing NIMAS directly to customers for digital instructional materials. We would be interested in additional information on customer success in obtaining NIMAS for born-digital materials.

17. **What devices / accessibility options do your braille reading students use to access digital content? (Choose all that apply.)**
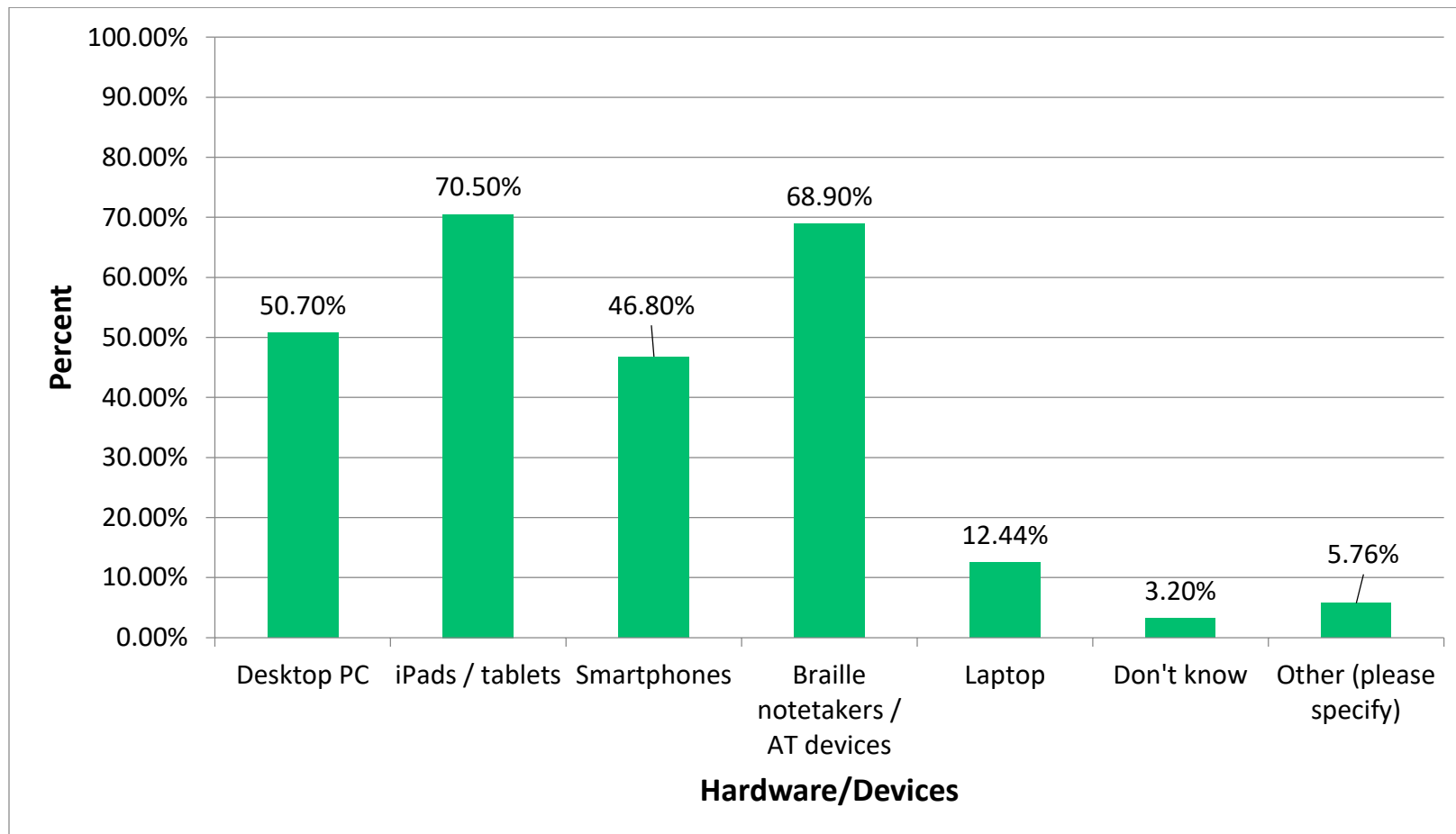
**Q17 Data**

| Answer Choices | Responses | |
|---|---|---|
| | % | *n* |
| Desktop PC | 50.70% | 220 |
| iPads / tablets | 70.50% | 306 |
| Smartphones | 46.80% | 203 |
| Braille notetakers / AT devices | 68.90% | 299 |
| Laptop | 12.44% | 54 |
| Don't know | 3.20% | 14 |
| Other (please specify) | 5.76% | 25 |

**Observations:**

- While 68.9% of respondents reported the use of braille notetakers and other AT devices, the use of iPads/tablets was slightly more prevalent, with 70.5% of respondents reporting their use.
- 50.7% of respondents indicated the use of desktop computers, and nearly as high a percentage (46.8%) indicated that braille-reading students were using smartphones to access digital content.

**18. What accessibility option is primarily used to access digital content?**
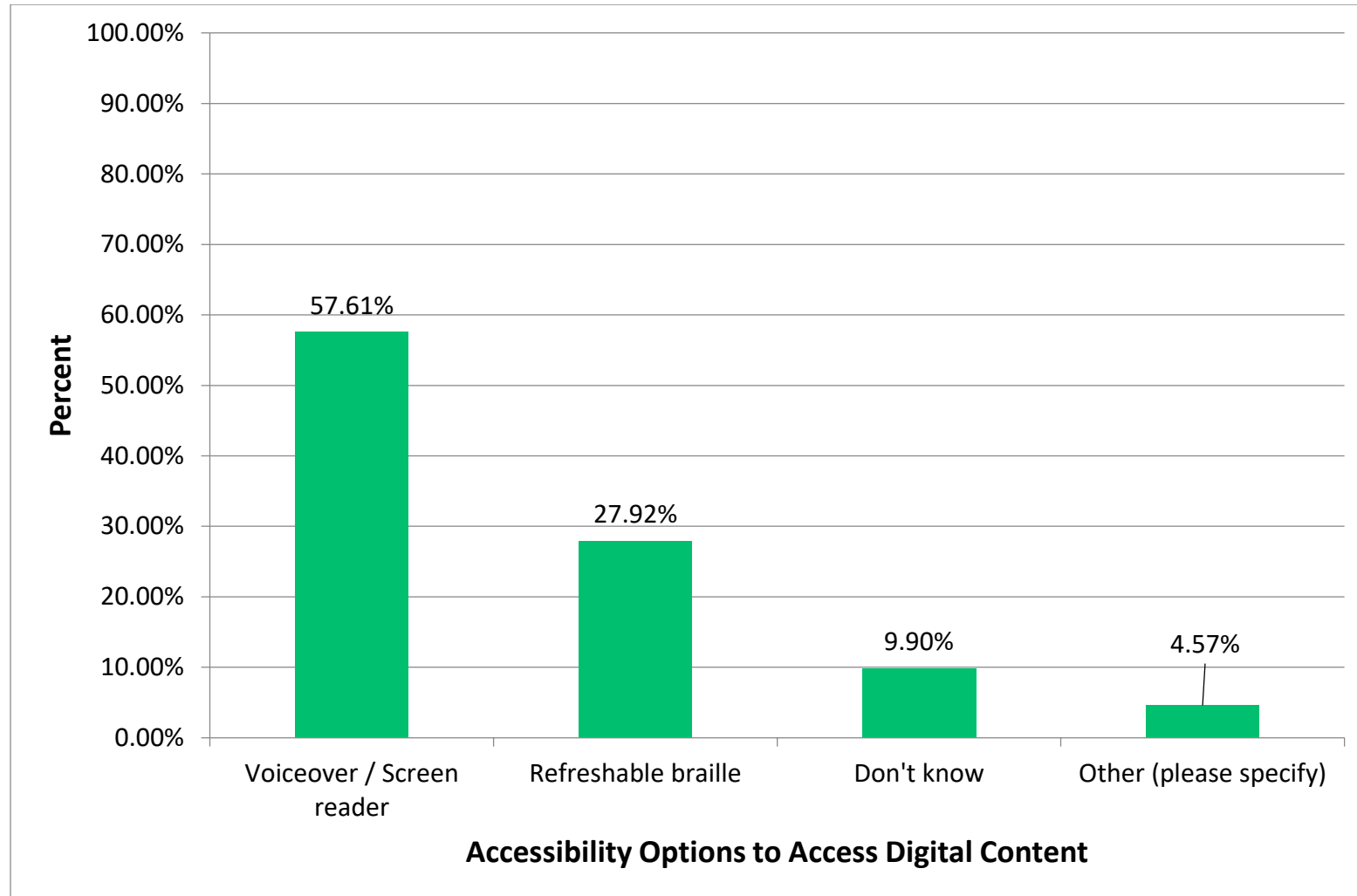
**Q18 Data**

| Answer Choices | Responses | |
|---|---|---|
| | % | *n* |
| Voiceover / Screen reader | 57.61% | 227 |
| Refreshable braille | 27.92% | 110 |
| Don't know | 9.90% | 39 |
| Other (please specify) | 4.57% | 18 |
| **Answered** | **394** | |
| **Skipped** | **40** | |

**Observation**: Twice as many respondents reported the use of voiceover/screen reader as the primary method used to access digital content compared with refreshable braille. Less than a third of respondents (27.92%) indicated refreshable braille as the primary means used to access digital content.

19. **How concerned are you that the needs of braille reading students are not currently being met with regard to access to born digital materials?**



Chart: Percent (y-axis) vs Concern that Needs of Braille Reading Students Not being Met (x-axis)

- Not Concerned: Students are being well served — 5.58%
- Somewhat Concerned: Students are not being well served in all cases — 31.98%
- Very Concerned: Students are not being well served — 55.08%
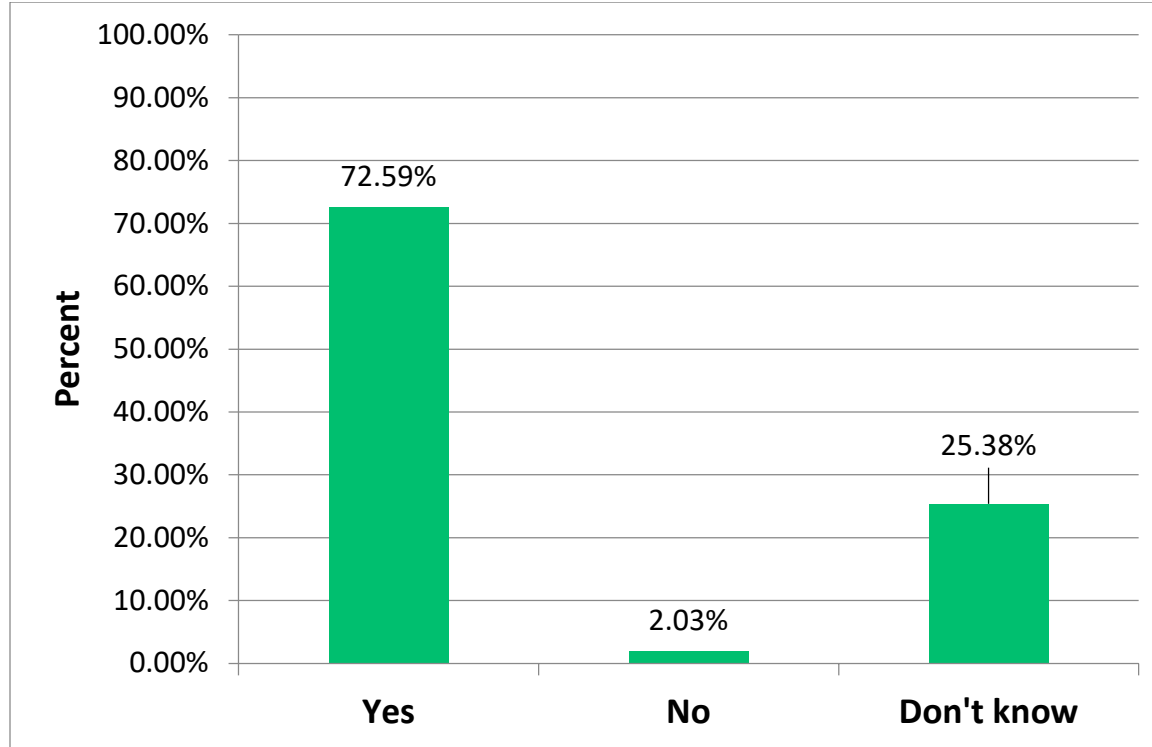- Don't know — 7.36%
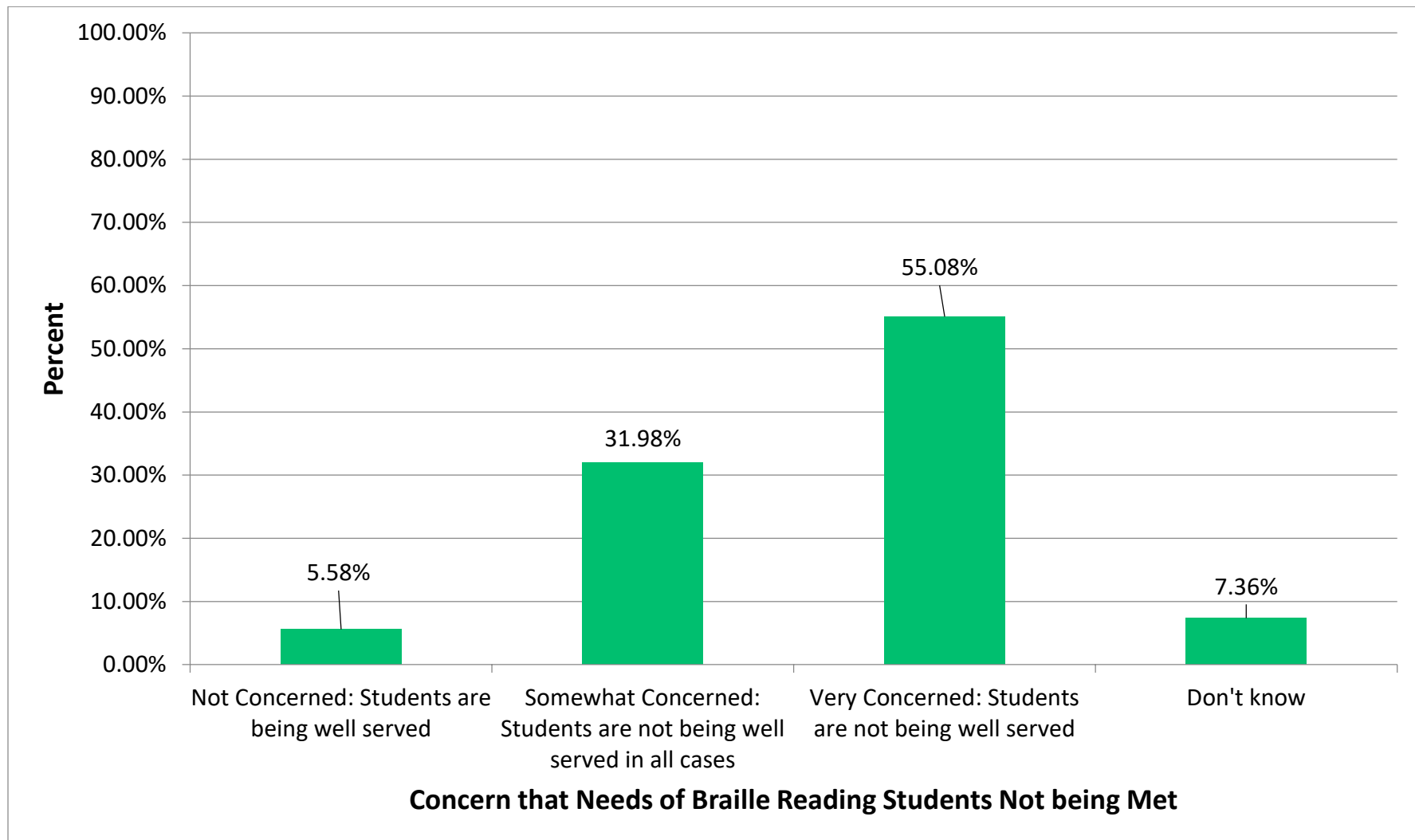
**Q19 Data**

| Answer Choices | Responses | |
|---|---|---|
| | % | n |
| Not Concerned: Students are being well served | 5.58% | 22 |
| Somewhat Concerned: Students are not being well served in all cases | 31.98% | 126 |
| Very Concerned: Students are not being well served | 55.08% | 217 |
| Don't know | 7.36% | 29 |
| | **Answered** | **394** |
| | **Skipped** | **40** |

**Observations:**
- A majority of respondents (55%) indicated they were Very Concerned that the needs of braille reading students are not being met with regard to access to digital instructional materials.
- Over 87% of respondents indicated that they were either Very Concerned or Somewhat Concerned.
- Less than 6% of respondents indicated that they were Not Concerned.

**20. If NIMAS could be obtained from publishers for born-digital content, do you believe this would improve access to the curriculum for braille-reading students?**

**Q20 Data**

| Answer Choices | Responses | |
|---|---|---|
| | % | n |
| Yes | 72.59% | 286 |
| No | 2.03% | 8 |
| Don't know | 25.38% | 100 |
| **Answered** | **394** | |
| **Skipped** | **40** | |

**Observations:**
- Almost three fourths of respondents (72.59%) indicated that they thought the ability to obtain NIMAS for born-digital materials would improve access to the curriculum for braille-reading students.
- 2% of respondents indicated that they did not think obtaining NIMAS for born digital materials would help, while just over one fourth of respondents (25.38%) indicated that they did not know.

**21. Are there any additional comments you have related to any question(s) above? Please feel free to include them here.**

**Observations:**

- 92 out of 434 participants (21%) provided substantive comments.
- Comments such as "No," or "None at this time," were excluded.

| Key Themes | *n* | % |
|---|---|---|
| Concern related to accessibility of online materials | 38 | 41.30% |
| Importance of Braille (teach earlier, stress importance often) | 5 | 5.43% |
| Access to materials (materials, timely manner, technology for learning) | 13 | 14.13% |
| Instructional concerns (TVI use, challenge with using materials, preparation for teaching braille students) | 17 | 18.48% |
| School district support | 2 | 2.17% |
| Files (NIMAS, publisher) and support (file sharing, access) | 4 | 4.35% |
| Define terms in survey (e.g., born-digital content) | 2 | 2.17% |
| Platforms (e.g., navigation) | 4 | 4.35% |
| Training (e.g., teach students to become independent) | 2 | 2.17% |
| Other (e.g., no braille students, just learning Braille) | 5 | 3.26% |

**Top Three Themes:**

- Concerns related to accessibility of online materials          (41.30%)
- Instructional concerns (e.g., challenges with using materials)          (18.48%)
- Access to accessible materials (e.g., timely delivery)          (14.13%)

## Q21. Sample Comments by Key Theme

(Please note that comments appear as provided in the survey; they have not been edited.)

**Concern related to accessibility of online materials**
- Braille students are being excluded from content materials that are only produced in the digital format. Something is wrong when companies specifically state that their on-line content is not accessible for braille readers and no other option to participate is given.
- Even if we were able to copy and paste materials into documents, that would be helpful. Graphics are a lot more difficult and that is where the full page braille display would be helpful but it also needs to be fairly simple to produce.
- Most of the issues are that the visually impaired/ blind students cannot access digital content with their devices because the programs (Canvas, i-Ready)  are not accessible.
- Our blind students are essentially being denied access because schools insist on using digital curriculum without providing for braille readers. They are throwing  audio versions at us under the guise of accessibility, despite the fact that many braille reading students are not auditory learners and need the braille reading experience for good retention.
- The hardest area for accessibility is always math. In addition the need for tactile diagrams or audio descriptions are still needed.
- We have the same issue with standardized tests that the districts use. They are not accessible, MAPS for example claims to be accessible with JAWS, but provides no tactile graphics, haves and extra line of dots that throws off new Braille readers, cashes and freezes. Also, the vocabulary used to describe the graphics is not always age appropriate.
- There is a continued barrier when it comes to graphs and picture oriented content. Not to mention access to interactive elements.

**Importance of Braille (teach earlier, stress importance often)**
- As a totally blind TVI, I feel that braille is being underused in classrooms. Many students are encouraged to only learn a small amount, and more focus is put on using screenreaders. I feel that this is a huge disservice to students.
- Braille is integral and should be started as early as possible.
- Braille is so important to our students that I feel we need to continue to stress its importance as often as possible.

**Access to materials (materials, timely manner, technology for learning)**
- Even with files available (Q20), the volume of classroom use is high. Having material in a timely manner would continue to be a challenge.
- Digital-born content should be required to be designed with wcag2.0 standards met so that access with a braille display, in the interactive environment, is effective.
- Children need devices to access curriculum that is modified for them including brailled documents, large print etc...  There also needs to be a set time where the TVI can share ideas with the staff members at the school they serve.
- There is a need for Braille materials for beginning Braille readers who are several grades below grade level. Example: 7th grade student who needs instruction in content, but gets frustrated when materials are too difficult to read. If doing a Science unit on Forces/Motion, it would be nice if there were digital files to produce that are at lower reading levels.

**Instructional concerns (TVI use, challenge with using materials, preparation for teaching braille students)**
- We produce braille only when students are in the younger grades. However, depending upon the subject, as the student moves through the grades, we suggest that they try different digital formats so they are flexible once they enter college and the workplace.
- With documents that are shared with my student and accessed with a refreshable braille device, it is difficult for her to write her answers in a new document when required.
- If it wasn't for voice over and screen readers, my blind students would not be able to  keep up with class assignment since we can only produce in braille what the schools can give us to transcribe.
- Concerned about the fluid nature of the use of these digital products.  This makes anticipating the use of the materials challenging and creates a potentially huge void of materials.

**School district support**
- It's extremely difficult to support academic braille readers when my district's tech people absolve themselves of any responsibility. None of the general digital assessments are accessible, and most of the teaching material is inaccessible.  There is some very limited support available from the state school's tech man, but he is spread so thinly that we are lucky if we see him once a year.  So essentially, I am a self-taught TVI, constantly dealing with tech problems and trying to engineer adaptations on the fly. It's very difficult.

- Our state textbook department does not include the IRC in decision making process for adopted materials. Only discuss when problems arise.

**Files (NIMAS, publisher) and support (file sharing, access)**
- It would be wonderful if braille files could be shared among counties or states.
- NIMAS files are already available in many cases. Not all are well formatted so we use software to convert them.
- I struggled with question 20 because our NIMAS center always wants a print copy in addition to the NIMAS file and I am not sure we will be able to get that easily so that we have both.

**Platforms (e.g., navigation)**
- My main concern is that JAWS performs poorly on modern websites. The Google platform is a hassle to use with screen readers. Even Google Vox is glitchy.
- Navigation of learning platforms and digital curriculum is a HUGE barrier for students who are braille readers whether they are using refreshable braille or auditory tools.

**Define terms in survey (e.g., born-digital content)**
- The term born-digital content should have been defined in this survey.   I don't know what it means and I'm sure I am not alone.
- Please define words such as "born-digital content" and some other terms. These aren't clear in the survey or explained properly.

**Training (e.g., teach students to become independent)**
- Training is also needed to help with learning to access the various components of the digital curriculum on various devices.
- Need additional training and time to tech students how to become independent with the new technologies and ways of accessing the materials.

**Other (e.g., no braille students, just learning Braille)**
- How do I get additional resources for Braille?
- Braille production and access is such a complex issue that it is hard to quantify in a survey such as this-not a survey problem, rather a problem with the multiple and conflicting attitudes about Braille and its usage,
- We are just learning Braille in our shops and don't have all the answers.

**22.** **Are there other critical challenges you are facing in providing accessible materials that were not included in the survey but that you would like to mention?**

**Observations:**

- 99 out of 434 respondents (22.81%) provided substantive comments.
- Comments such as "No," or "None at this time," were excluded.

| Key Themes | *n* | % |
|---|---|---|
| Graphical displays/Tactile Graphics | 10 | 10.10% |
| Time constraints (e.g., having enough time to prepare braille) | 9 | 9.10% |
| Costs | 5 | 5.05% |
| Accessibility of Digital Materials | 35 | 35.35% |
| Curriculum & instruction | 14 | 14.14% |
| Training/support | 8 | 8.10% |
| Platforms/Software (e.g., Google) | 5 | 5.05% |
| Achievement testing | 8 | 8.10% |
| Other (e.g., public attitude) | 5 | 5.05% |

**Top Three Themes:**

- Accessibility of Digital Materials (35.35%)
- Curriculum & Instruction (14.14%)
- Graphical Displays/Tactile Graphics (10.10%)

## Q22. Sample Comments by Key Theme

(Please note that comments appear as provided in the survey; they have not been edited.)

**Accessibility of Digital Materials**
- If we just have books online with no braille access, then we might just as well not have books at all.  Braille access is CRITICAL!  Refreshable may be okay-as long as students are able to have graphs and charts in braille too.
- Yes. Many websites are still hard to be accessed by screen readers. Even teachers created powerpoints are very disorganized by content order when accessed with a digital display.   The information jumps back and forth. Advertisements on the websites are also distractions when try to teach a student during the allotted time.   Public education is in the topic of accessibility/digital literacy is critical.
- When Google makes updates, accessibility goes out the window!
- Schools ability or lack of ability to purchase assistive technology that were recommended by a TVI or CATIS.
- Classes often use websites that are not accessible via screen readers. This gets very frustrating when a student is required to access the same information as the sighted peers.
- Digital content online is constantly being updated so what I braille last week may appear differently next week. Online games are very inaccessible. Even online textbooks that supposedly have accessibility features built in for low vision students are poorly adapted and difficult to navigate.

**Time (e.g., transcription time)**
- Time. Adapting digit formats to meet the needs of students takes time, and materials do not always get into the hands of students at the same time as their sighted peers.
- The time to locate and produce materials on top of the teaching time sometimes means TVIs have to work long unpaid hours or it doesn't happen.

- Yes a timely manner of the classroom teacher can be a concern. You are prepared and they change their mind on what they use to teach a lesson. It is next to impossible to have the braille prepared on a short notice and it is not fair to the learner.

## Costs
- Money for accessible braille note takers
- High cost of technology facing districts.

## Graphical Display/Tactile Graphics
- Tactile graphics are often difficult to find and I end up trying to make them as best as I can.
- Tactile Graphics are the most time-consuming.
- Availability of multiline refreshable Braille displays

## Curriculum & Instruction
- Quality of materials and the extended time it takes to get new materials made. When new curriculum is adopted it is practically impossible to get the braille materials at the same time.
- Several lower-funded districts still use older materials and text.
- So many teachers use "Free" PDFs found on line which contain too many spelling and grammatical errors.
- Textbook adoption for our district in not approved by the school board until May which delays hard copies of Braille textbooks.
- Yes, online databases for researching materials for students writing papers

## Training & Support
- Students often need more training and technical support with their electronic Braille devices to be able to use them independently to access materials.
- Someone has to be in the classroom with my students to describe demonstration videos which are often used daily in each of the classes

- Shortages in the field of TVIs, O&Ms and trained transcribers.
- Not enough transcribers to receive materials in time for instruction

**Platforms/Software**
- In some cases, the files received from NIMAC are not correctly formatted for textbook use (e.g. numbering misaligned in text)
- Difficulties with file conversion from PDF to Word which is the most compatible app for producing braille with Duxbury
- Files obtained from publishers bcz of NIMAS are NOT useable.   They need a ton of cleanup before they can be transcribed.
- The use of Google Classroom with its screenreader and different navigation keys is a challenge, since my students are proficient with JAWS and find Google apps slow and annoying to navigate.

**Achievement Testing**
- We do MAP testing in our school and every time we do testing we struggle to get the programs to work. They are not braille friendly and even after connecting the braille senses up to them and using a JAWS program the test still constantly freezes up on us and causes headache. Any help we could get with this program would be wonderful!
- TESTING  Our state is stressing online tests that are a nightmare for our students who use braille.  They are not accessible to navigate and have no charts, graphs, maps, etc.  It is difficult to scan back for necessary information. Many, many problems!
- MAP testing is a terrible challenge!  Although our state has worked with the company to help make it accessible to blind students, in all reality, it is not a good method to show what our students know.

**Other**
- Teachers of mainstreamed Braille reading students are not sensitive to the critical need of Braille reading students to have their class work and tests in Braille.