Comparing Middle-School and College Students' Mental Models of the Internet

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Background

Children's knowledge of the social affordances of the Internet develops in advance of technical understanding, which may be limited even among adults (Yan, 2009). However, Zhang (2008) found that college students do have a complex mental model of the Internet. This mental model consists of four facets: components, functions, attributes, and feelings.

Objective

Compare how two disparate groups, consisting of rural middle-school students and urban college students, respectively, conceptualized the Internet.

Participants

Middle-school students were from a school in a rural community in the midwestern United States (N = 78, M_{age} = 13.3 years, SD = 1.0, 56.4% female). Students self-reported their ethnicity as 88.7% White, 7.0% LatinX, 2.9% Native American, and 1.4% Black/African American.

College students were from an urban university in the northeastern United States (N = 124, M_{age} = 19.7 years, SD = 3.2, 66.9% female). Students self-reported their ethnicity as 40.3% White, 24.2% LatinX, 16.9% Black/African American, 8.1% Asian, and 10.5% Other.

Method

Students were asked to "Draw a picture to show me what the Internet looks like." After completing their drawing, students were instructed to "Use your picture to tell me about what the Internet looks like."

The following questions were used to elicit further understanding:

- What is the Internet?
- How big is the Internet?
- Where is the Internet?

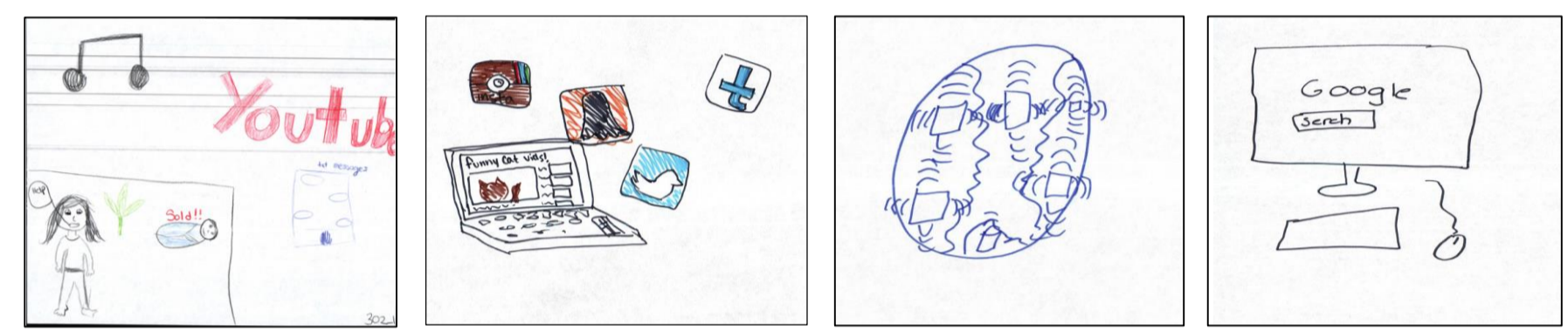Responses were audio-recorded and transcribed.

Coding of Responses

We adapted a coding scheme from Zhang (2008) to code students' drawings and explanations of the Internet for indicators of each of four facets of their mental models of the Internet (components, functions, attributes, and feelings).

We used a bottom-up approach to identify additional indicators of each facet. To qualify as an additional indicator, at least 5% of the students in either group had to mention it.
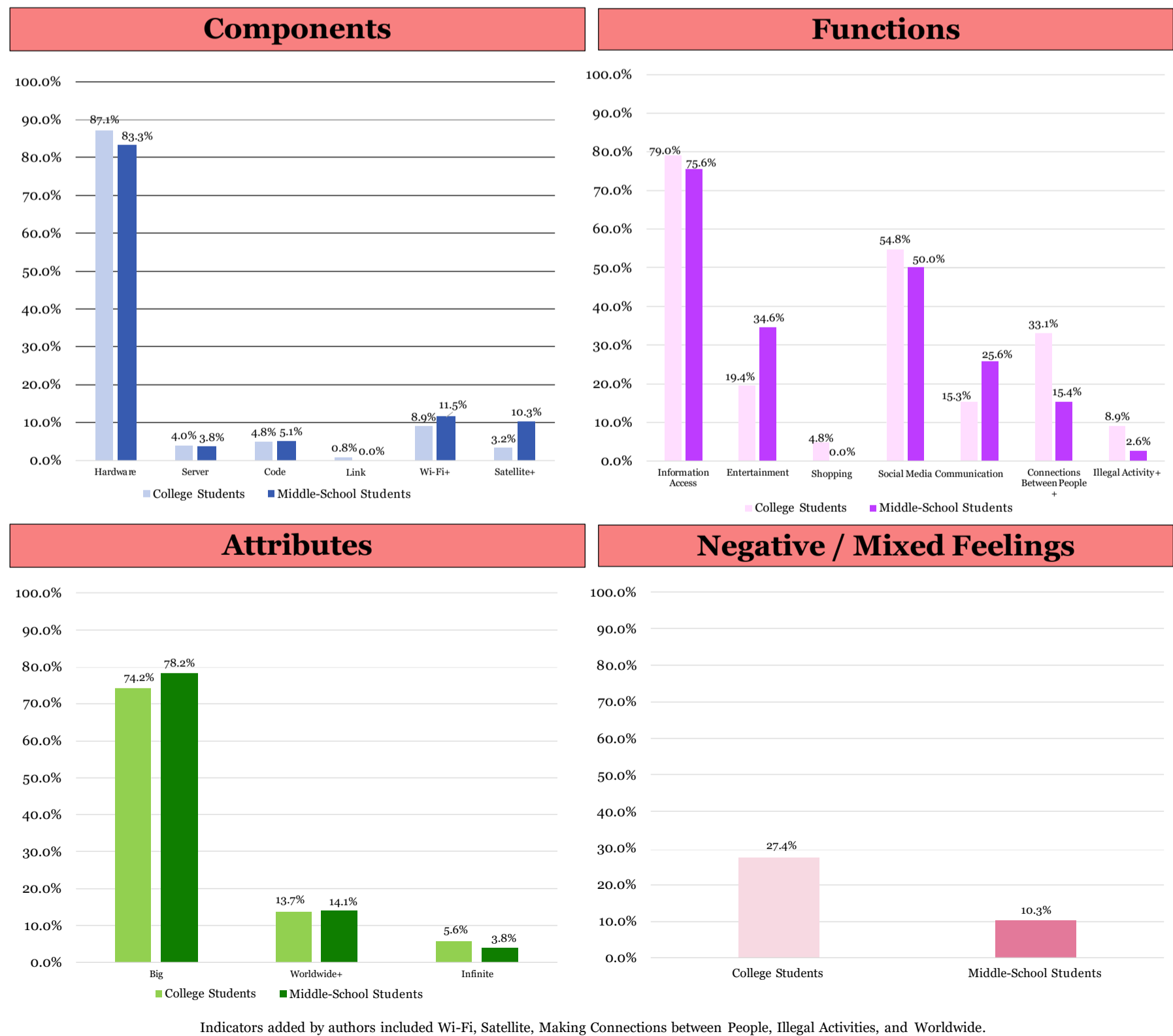
Examples of College Student Drawings
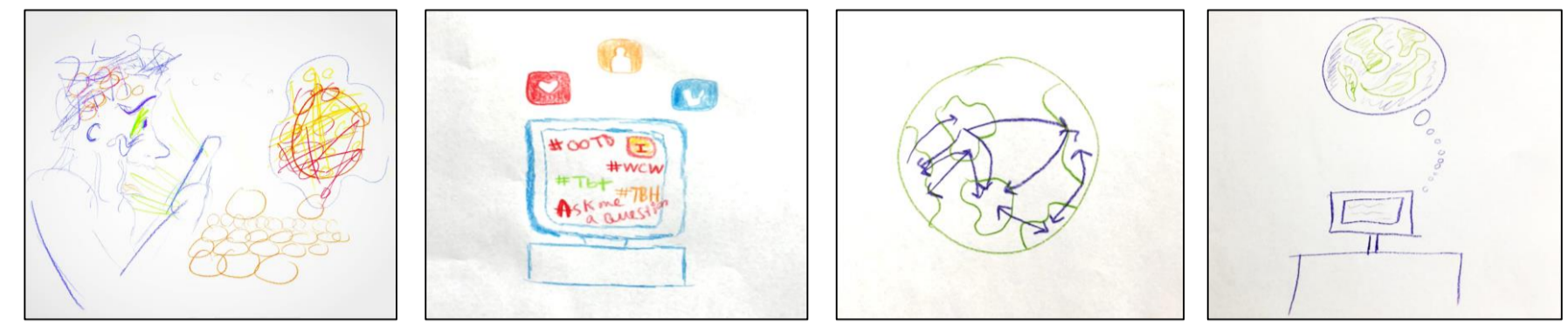
Examples of Middle-School Student Drawings

Indicators of the Four Facets of Students' Mental Models

Components

Functions

Attributes

Negative / Mixed Feelings

Indicators added by authors included Wi-Fi, Satellite, Making Connections between People, Illegal Activities, and Worldwide.

Chi-Square Tests Comparing Groups

Facet	Indicator	X^2 (df = 1)
Components	Any Components Mentioned	0.11
	Hardware	0.55
	Server	0.00
	Code	0.01
	Link	0.63
	Wi-Fi +	0.38
	Satellite +	**4.24***
Functions	Any Functions Mentioned	0.14
	Information Access	0.33
	Entertainment	**5.91***
	Shopping	**3.89***
	Social Media	0.45
	Communication	3.27
	Making Connections Between People +	**7.73****
	Illegal Activity +	3.16
Attributes	Any Attributes Mentioned	3.04
	Big	0.42
	World-wide +	0.01
	Infinite	0.33
Feelings	Negative or Mixed	**8.56****

*p < .05, **p < .01; +Indicator added by the authors

Conclusion

Middle-school and college students appeared to hold similar mental models of the Internet.

In both groups, most students did not express concerns about the Internet, despite widespread societal concerns about cyberbullying, online privacy, and fake news (O'Keeffe et al., 2011; McGrew et al., 2018).

Students' conceptualizations seemed to be closely linked to physical interactions with Internet-enabled devices. This limited understanding of the Internet's technical components across age groups and communities suggests the need to add explicit instruction on how the Internet works in media literacy efforts.

References

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