Microsoft

EMPOWERING AMERICA'S STUDENTS

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I. INTRODUCTION AND SUMMARY

As the company that spends more on research and development than any other company in the United States,[1] Microsoft firmly believes in investing today for a promising future. The E-rate program is an investment in America's future. Microsoft believes that technology can help bridge the opportunity divide and secure the future of young people and the global economy and is proud of its unparalleled commitment of resources to improving educational opportunities for students. It has developed a rich, deep, and broad experience in working with teachers and schools to provide and enhance educational opportunities for literally millions of students around the world through one-on-one tutoring, educational grants, educational instruction programs, education tools, and software.

Microsoft donates on average $2 million worth of software *every day* to non-profits

Microsoft's YouthSpark program has served 103 million children globally

75,000 teachers use the free Skype in the Classroom resource

186 non-profit organizations have received grants from Microsoft YouthSpark

[1] See 2013 OECD Global R&D Report, *available at* <http://iri.jrc.ec.europa.eu/scoreboard13.html>.

Microsoft's experience gives it an in-depth understanding of the many (and variable) needs of teachers and schools as they seek to provide the best educational opportunities for their students. Microsoft is delighted to draw on that considerable experience to provide the Commission with recommendations and insights on how best to achieve the laudable goals of the President's ConnectED initiative and the Commission's modernization of the E-rate program. These recommendations include the following:

- **Stretch E-rate dollars further: reduce costs by encouraging smart bandwidth usage through innovation and modernization.** Microsoft heartily supports bringing greater bandwidth to schools, but the E-rate program also should encourage schools to make smarter use of the bandwidth they have by adopting a system-level design method of evaluating applications and incentivizing the use of technologies – such as caching and multicasting – and connectivity arrangements – such as Regional Education Networks – that maximize bandwidth efficiency.
- **Remove blockers to achieving the foregoing cost savings and system-level efficiencies by modifying the Eligible Services List and priority structure.** To enable and facilitate adoption of bandwidth-efficient technologies, the Commission ought to re-categorize services among the priority buckets, lift current restrictions, or even conflate the two priority buckets.
- **Support an uncompromised learning environment for children by protecting the digital privacy of students.** Protect students in the digital education space by preventing the use or sale of student data for purposes of advertising or marketing.
- **Harness the benefits of technological innovation by promoting new low-cost, high-quality connectivity methods.** The Commission should include TV white spaces equipment on the Eligible Services List once the equipment becomes certified in the United States and, when exercising its spectrum assignment responsibilities, should continue to consider the significant educational benefits that could be offered by unlicensed spectrum use.

II. INCREASED BROADBAND CONNECTIVITY IS CRITICALLY IMPORTANT FOR EDUCATION

Microsoft strongly supports the Commission's goal of increasing broadband connectivity for schools and libraries[2] and, specifically, supports the President's ConnectED initiative and the related

[2] The first of the Commission's three proposed goals for the E-rate program is to "ensure that schools and libraries have affordable access to 21st Century broadband that supports digital learning." *See Modernizing the E-rate Program for Schools and Libraries*, Notice of Proposed Rulemaking, 28 FCC Rcd 11304, ¶ 17 (2013) ("*Notice*").

modernization of the E-rate program.[3] Powerfully effective education is the foundation of the United States remaining exceptionally competitive in the global economy. The goals of the President's ConnectED initiative are focused, properly, on preparing America's students with the skills they will need for a global, digital, and fast-moving economy. Modernization of the Commission's E-rate program is an essential element of that initiative.

Education increasingly takes place in a digital environment – even within the physical classroom. The Internet is a vibrant resource library, experts and leaders speak to students using IP communications technologies, teachers communicate with parents and collaborate with each other using online technologies such as Skype and e-mail, and students take their classrooms home with them in the form of tablets and laptops. These education mechanisms depend, first and foremost, on a level of Internet connectivity that is commensurate with 21st century usage. Connectivity is essential. Indeed, Microsoft has a history of supporting connectivity to schools and libraries. For example, Microsoft – along with the Schools, Health and Libraries Broadband Coalition – advocated for funding high capacity connections for schools and libraries as part of NTIA's BTOP Recovery Act efforts. Yet, as explained further below, schools and libraries not only need greater bandwidth; they also need the tools to use their bandwidth resources in a more efficient and effective manner.

III. MICROSOFT IS COMMITTED TO DIGITAL LEARNING AND EDUCATION

Microsoft has devoted – and continues to devote – considerable resources to digital learning nationwide and globally. The Appendix to this document provides details on some of these initiatives which include:

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[3] Microsoft expressed its support for these programs through the signature of Microsoft's then-CEO Steve Ballmer to the EducationSuperHighway E-rate letter to the FCC. Letter to Chairman Wheeler, FCC, from Mike Jeffries, Abercrombie & Fitch, *et al.*, WC Docket No. 13-184 (Jan. 30, 2014), *available at: <http://apps.fcc.gov/ecfs/document/view?id=7521069438>.*

- **ConnectED support.** Microsoft recently pledged ***one billion dollars*** in savings and support ***over the next year*** to bring affordable technology to students in support of the ConnectED initiative through the wide-scale offering of free Microsoft Office to students, operating system discounts to make connected devices more affordable, IT training and certification, and support for private subsidies on unlimited broadband connections at home.[4]
- **Technology Education and Literacy in Schools (TEALS).** Where schools cannot meet computer science education needs on their own, Microsoft's TEALS program places high-tech professionals in classrooms – physically and remotely. These real-world experts work in cooperation with regular classroom instructors to teach computer science to students that might not otherwise have the ability to receive computer science instruction. In the 2013-2014 school year, 25 percent of TEALS students were female (two times the industry average) and 28 percent were under-represented minorities (five times the industry average).[5]
- **Skype in the Classroom.** Used by over 75,000 teachers, Skype in the Classroom, which is free, allows teachers to take their students on virtual field trips, invite guest speakers to the classroom, and meet with other students in classrooms around the world using Skype and a broadband connection.[6]
- **YouthSpark.** This Microsoft global initiative seeks to create opportunities for 300 million young people over three years and, through 30+ programs and partnerships with 186 youth-serving non-profits, YouthSpark created opportunities for 103 million youth in its first year.[7]
- **Microsoft Partners in Learning.** Through Partners in Learning, Microsoft helps educators and school leaders connect, collaborate, create, and share to help students realize their full potential be it through facilitating networking and peer coaching for educators, generating new materials and educational approaches, virtual university seminars, or the free Innovative Schools Toolkit.[8]
- **Bing for Schools.** Bing for Schools is the first and only major search engine to offer K–12 schools in the U.S. the choice to remove all advertisements from search results performed on the school network. It also enhances privacy protections, sets strict filters to help block adult content, and adds specialized learning features to promote digital literacy. Parents can earn Bing Rewards from performing searches on Bing and donate those rewards to a school which, in turn, can redeem those points for free Surface tablets for the classroom.[9]
- **In-home broadband connectivity.** Microsoft provides financial support to its non-profit partner EveryoneOn which offers home Internet service for as low as $10 for households with children that qualify for the National School Lunch Program.[10]

In developing and executing on all of these programs, Microsoft has met with tens of thousands of students, teachers, and school administrators around the country. Through these interactions,

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[4] *See* Appendix at 1-2.
[5] *See id.* at 2-3.
[6] *See id.* at 4.
[7] *See id.* at 5.
[8] *See id.* at 5-6.
[9] *See* Appendix at 6-7.
[10] *See id.* at 7 and visit <http://www.everyoneon.org/>.

Microsoft has developed deep insight into the challenges confronting schools and teachers across the country as they implement digital learning. More importantly, Microsoft uniquely understands how technology can solve many of those problems and it knows first-hand the transformative benefits that digital learning can provide to students today. Microsoft is proud to draw upon this experience to share with the Commission the following proposals for enhancing and modernizing the E-rate program.

IV. MAKING SMARTER USE OF BANDWIDTH

The record contains substantial support for increasing the connectivity of schools and libraries and either increasing their bandwidth or enhancing internal facilities to take advantage of the Internet speeds that reach the school.[11] Microsoft strongly supports that position. Educational tools are becoming increasingly Internet-dependent and suboptimal Internet connectivity limits the full potential for educating students.[12]

Much of the discussion in the record is focused on the appropriate level of bandwidth for schools. It is important to ensure that schools have the requisite bandwidth to effectively and intensively use promising Internet-based forms of digital learning. Yet, discussion of necessary reforms must not singularly focus on the appropriate level of bandwidth for schools. Since the E-rate program was created nearly two decades ago, we have observed significant technological developments that allow us to revisit the dated assumptions about how best to deliver broadband

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[11] *See, e.g.,* Verizon and Verizon Wireless Comments at 3; AT&T Comments at 2; National Cable & Telecommunications Comments at 3; Telecommunications Industry Association Comments at 2. Unless otherwise noted, all comments and reply comments referred to herein are those filed in WC Docket No. 13-184 in response to the Notice of Proposed Rulemaking released on July 23, 2013.
[12] *See, e.g., Notice* at ¶ 1 ("Increasingly, schools and libraries require high-capacity broadband connections to take advantage of digital learning technologies that hold the promise of substantially improving educational experiences and expanding opportunity for students, teachers, parents and whole communities.").

capacity to schools and libraries and how students and teachers can make the greatest use of the broadband resource. The effort to improve capacity must be more refined than merely adding Gbps. The manner in which schools utilize their connectivity affects their bandwidth demand and the amount they must spend to fulfill it. Supporting the use of bandwidth-optimizing practices and technologies will reduce wasteful expenditures on greater bandwidth – stretching E-rate funds further, squeezing more usability out of every broadband dollar, and improving performance for schools.[13] In addition to increasing the bandwidth of connections to and within school premises, schools can and should take steps – with E-rate support – to improve the speed and quality of existing connections through smarter networks.

In proposing the Commission's second goal for the E-rate program of maximizing the cost effectiveness of E-rate funds, the *Notice* states that "[e]nsuring that schools and libraries spend E-rate money in the most cost-effective ways possible maximizes the impact of limited E-rate funds and helps ensure that all eligible schools and libraries are able to receive all the support they need."[14] While that goal appears to be focused on preventing waste, fraud, and abuse, it also should be expanded to encourage modernization: eliminating expenditures for outdated services and promoting the use of technologies that overcome wasteful bandwidth utilization. Some of the rules

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[13] Chairman Wheeler recently explained that "only about half of the [E-rate] program's funds go for broadband connectivity. Well less than half goes for the kind of 100 mbps and higher speeds necessary for today's learning environment." Prepared Remarks of Tom Wheeler, Chairman, Federal Communications Commission at National Digital Learning Day, Library of Congress (Feb. 5, 2014). Like many of the participants in this rulemaking, Microsoft supports elimination of E-rate funding for outdated services such as paging, directory assistance, inside wiring maintenance, call blocking, and text messaging. *See* Sprint Corporation Comments at 16; Hewlett-Packard Comments at 15-16. Spending on outdated services, however, is not the only form of waste to be addressed. Inefficient bandwidth utilization practices are to broadband the way gas guzzling cars are to gasoline. Both a fuel efficient car and a gas guzzler can get a passenger from point A to point B, but the gas guzzler will eat up more funds without improving outcomes or results.

[14] *Modernizing the E-rate Program for Schools and Libraries*, Notice of Proposed Rulemaking, 28 FCC Rcd 11304, ¶ 41 (2013) ("*Notice*").

and restrictions in the existing E-rate program interfere with that goal and should be modified, with a few examples outlined below.

Caching and Localized Access. One method of maximizing bandwidth usage efficiency is employing a caching system. By locally storing and replaying content that must be accessed repeatedly, a cache system will prevent duplicate bandwidth usage thereby reducing unnecessary burdens on a school's connectivity. For example, a teacher may assign students to watch an instructional video from an Internet website. Without caching, every student will independently download the exact same content. That is, if there are 25 students in the class, the video will be downloaded 25 times. Through a cache system, the first student's download will be saved locally. Students 2 through 25 will access the locally stored copy of that video without having to burden the school's Wide Area Network (WAN) connectivity to the Internet to watch the video. In this particular example, without employing a cache system, the school would need 25 times the bandwidth to accomplish the same task. Thus, caching helps schools to utilize bandwidth efficiently – reducing the amount of bandwidth they think they'd otherwise need (and, ultimately, lowering costs).[15]

[15] An adjunct to caching is distributed caching which allows members of the peer network (*e.g.*, a teacher or fellow student) to obtain content from a near peer (*e.g.*, the device of another student that has already downloaded the content from the Internet) without having to seek that content from the original source location (*e.g.*, an Internet website). Accordingly, the broadband connection to the school needn't be burdened with using the public Internet to seek the data from the original content source and download it back to the school. Distributing caching can provide additional efficiencies and resiliency by avoiding traffic bottlenecks. A well-designed system would minimize the burden on the school's local area network and enhance content delivery speeds by recognizing whether the school cache or a near peer provides the most efficient source for obtaining the content requested.

Yet, the Eligible Services List denies support for caching servers and caching services (unless the latter is included in their Internet access service pricing).[16] Thus, schools that save money by obtaining Layer 1 or Layer 2 Internet connectivity (the type of connectivity that would not include a caching service) will not receive E-rate support for a bandwidth-efficient caching system. The FCC should encourage efficient broadband usage practices by explicitly including caching in the ESL.[17]

Multicasting. Multicasting is another way that schools could use bandwidth more efficiently. A teacher sending content to the entire class can use local area network (LAN) bandwidth more efficiently through multicasting. A video multicast device (*e.g.,* a computer running a free VideoLAN client)[18] creates a video stream that is sent to a special multicast "channel" where the students tune in their devices (also running multicast clients) to view the contents. Rather than unicasting a separate copy of the video to each student (which burdens the LAN to carry duplicated data *e.g.*, one stream per student), multicasting distributes one copy of the video presentation's digital packets to the network and permits multiple students to access the single data stream simultaneously. Conceptually, multicasting can be thought of as similar to tuning into a radio station. A broadcast radio station does not send an individual signal to each and every listener of the broadcast. Rather, listeners tap into the single broadcast stream. Digital multicasting permits content to be distributed via one data stream rather than over duplicative individual data streams, the latter using unnecessary LAN bandwidth to accomplish the same purpose. Efficient use of LAN resources is a better use of E-

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[16] *See* "Schools and Libraries Universal Service Support Mechanism Eligible Services List," CC Docket No. 02-6; GN Docket No. 09-51 at p. 7 (rel. Oct. 22, 2013).

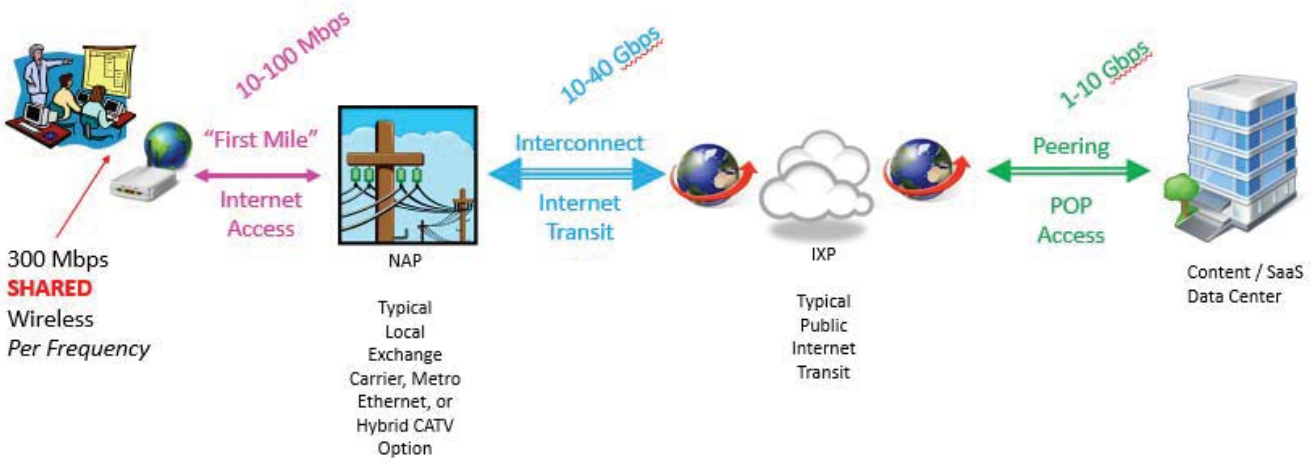
[17] As noted below, the Commission may wish to institute a system-wide analysis of the cost effectiveness of applications so that schools can use savings on connectivity (e.g., savings they have derived through the use of Regional Education Networks) to enhance technologies and purchase services that will make better and smarter use of that bandwidth.

[18] VideoLAN is a free cross-platform media player. *See* <http://www.videolan.org/vlc/>.

rate resources than "over-building" LAN capabilities to accommodate inefficient bandwidth utilization practices and schools should be incentivized to implement efficient solutions.

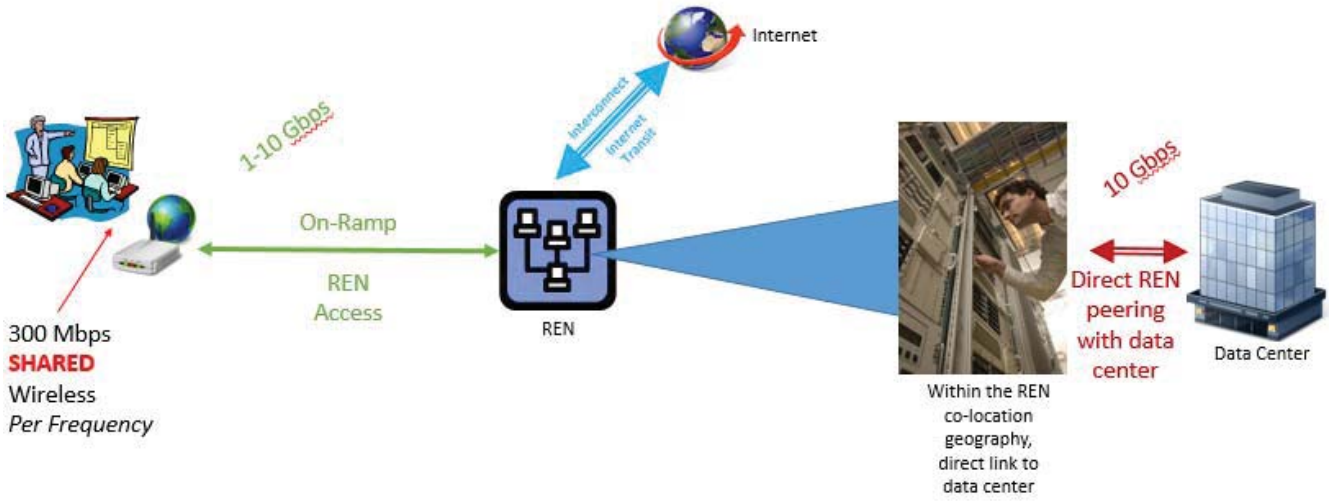
Leveraging Regional Educational Networks to Lower Expenses and Improve Services. The Notice asks how consortium purchasing can drive down prices and benefit E-rate applicants and the E-rate fund.[19] Regional Education Networks ("RENs") offer ways for schools who opt to join them to generate financial, technological, and security advantages in the form of lower-priced, higher bandwidth broadband offerings, improved and more dynamic services and digital learning opportunities, and reduced administrative expenses. It is fairly obvious that RENs can aggregate individual school purchases to generate lower prices. A corollary benefit to affordability is that last mile connectivity becomes attainable at higher bandwidths.

Fig. 1 - Typical Individual School Connectivity Today



[19] *Notice*, ¶ 180; *see also id.* ¶186 (seeking comment on ways that use of Regional Education Networks can reduce prices and create administrative efficiencies).

Fig. 2 - School Connectivity via Single Regional Educational Network

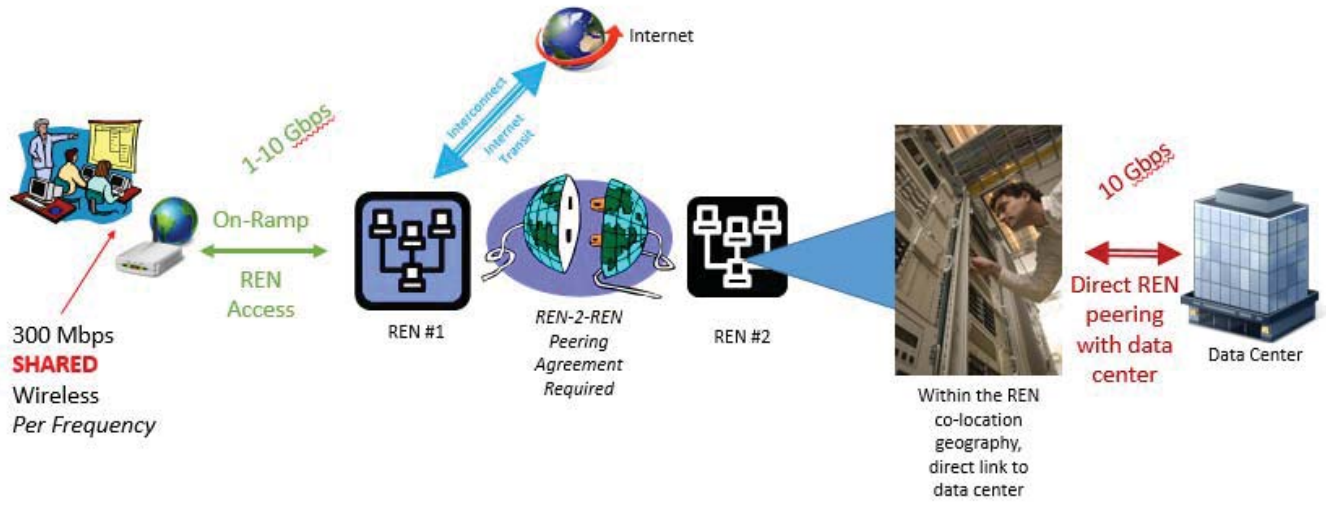


In addition, a REN takes responsibility for managing what is similar to a private high-speed network backbone within a specific geography dedicated to educational use and helping individual school members by maintaining subject matter expertise in information and communications technologies. Thus, individual schools needn't maintain individual IT expertise – indeed, that strays from their core purpose. Rather, individual schools can take advantage of communications and information systems that are otherwise available only to the larger institutions that have such expertise. For example, facility owners typically charge more for a network level (Layer 3) Internet service than simply the physical layer (Layer 1 dark fiber) or medium access control layer (Layer 2). Most schools lack the expertise or facilities to render Layer 1 or Layer 2 offerings financially attractive or usable. A REN can purchase Layer 1 or 2 offerings to its closest point of presence, take on the responsibility of electronics, management, routing, etc., and perform the necessary Layer 3 functions to oversee connections for multiple schools.

Further, RENs are better able than individual schools to access cloud-based educational content of education content providers and other major institutions through direct connections to distributed cloud data centers and/or via REN-to-REN peering arrangements. Once schools are

connected, through their REN, to a cloud data center, they can experience higher quality of service connections to the content of other entities that exists in that cloud (*e.g.*, education content providers such as McGraw-Hill). In practical terms, this method of connection results in better performance for applications requiring low latency (e.g., voice and video conferencing).

Fig. 3 - School Connectivity with Multiple REN Peering



In addition, cloud services allow schools to scale their usage and storage precisely with their existing need (*e.g.*, no need to purchase extra-large on-premises servers now to account for the contingency of future growth) which aligns well with the E-rate program policies. By moving storage and processing to the cloud, schools will lower energy costs, reduce the real estate devoted to equipment, and minimize the costs of labor devoted to on-site equipment maintenance. Finally, by housing data in a protected, geographically dispersed infrastructure, schools can obtain better security to protect their sensitive data. Changes to the E-rate program should promote – and certainly not discourage –these modernized forms of connectivity and optimal bandwidth usage.

V. RETHINKING THE PRIORITIZATION MODEL

Broadband connections must be usable to be useful – and they must reach students, not simply school buildings. Merely connecting a school is of limited value if that broadband capability can't be distributed and used in ways that students actually benefit from it. Chairman Wheeler recently described a school in which the children had to walk around with their tablets in the air to find a WiFi signal: the students had tablets and were connected to the Internet – but their LAN capabilities were poor.[20] Like a bridge to nowhere, blazing speeds that halt at the school door and trickle through classrooms thereafter are not an effective (or efficient) use of E-rate funds.

When the Commission decided to fund Internal Connections only after completing funding for recurring connection charges, there was a presumption that the neediest schools would continue to obtain Internal Connections funding.[21] That presumption is no longer valid.[22] The record clearly demonstrates that, under the current system, many schools receive broadband funding in Priority One, but are unable to obtain Priority Two funding for, *e.g.*, internal connections because of funding limitations and the manner in which spending is prioritized.[23] Accordingly, under the current mechanism for distributing E-rate funds, schools have an incentive to seek more bandwidth to the school door, and less incentive to seek (or hope for) support for much-needed facilities, equipment,

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[20] *See* Prepared Remarks of Tom Wheeler, Chairman, Federal Communications Commission at National Digital Learning Day, Library of Congress (Feb. 5, 2014).

[21] *See Federal-State Joint Board on Universal Service*, Fifth Order on Reconsideration and Fourth Report and Order in CC Docket No. 96-45, 13 FCC Rcd 14915 at ¶ 38 (1998) ("We conclude that, to the extent that we are unable at this time to fund demand fully, the best approach is to provide full support for recurring services, and to direct support for internal connections to the neediest schools and libraries. We agree with commenters who state that it would be the most economically disadvantaged schools and libraries that would suffer if internal connections were not funded.").

[22] *See, e.g., Notice* at ¶ 63 ("[F]or the first time in E-rate program history, in funding year 2012, estimated demand for priority one funding alone exceeded the funding cap."); *see id.*, ¶ 62 ("[M]ore recently, the vast majority of requests for priority two services have gone unfunded.").

[23] *See, e.g., Fairfax County Public Schools Comments* at 2 (explaining that it has not received Priority Two funding since 2002, but "has a tremendous need" given infrastructure costs).

and services that will maximize the utility of that bandwidth because funding is likely for the former, but not the latter.

Microsoft strongly encourages the Commission, in modernizing the E-rate program, to encourage, rather than discourage, smart system-level design by judging the cost-worthiness of an application not at the "cost of the connection" level, but at the system level. Maximizing usable bandwidth necessitates a comprehensive, system-wide view of the delivery and use of broadband capabilities. The current prioritization system precludes the reduction in costs that could be realized through efficiencies derived from proper system-level design – efficiencies that cannot be achieved by engaging solely in the costly endeavor of increasing the speed of the external connections to the Internet. Relegating support for internal connections to a second tier promotes waste and inefficiency by reducing the ability of schools to utilize their bandwidth in an efficient manner. The Commission should elevate to Priority One those facilities, services, and purchasing arrangements that will promote smart and efficient use of bandwidth. Alternatively, the Commission should deconstruct the Priority One and Priority Two categories of covered services to enhance flexibility for schools and libraries, allowing them to make investments in ways that will maximize *usable* broadband connectivity, reduce their overall costs, and optimize the benefits of modern cloud-based education technologies. Eradicating the bias against modern and system-based methods of efficient bandwidth utilization has the potential to reduce overall demand on the Fund while simultaneously delivering higher quality results for schools and libraries.

VI. PROTECTING THE PRIVACY OF STUDENTS

Microsoft commends the Commission on its inquiry into the need for rule changes and clarifications concerning student privacy.[24] Schools strive to protect students in the physical world. As more learning occurs in a digital environment, the Commission's E-rate program should do more to ensure that children are protected in the digital world, as well. Indeed, parents are concerned.

90 percent
of U.S. voters are concerned about non-educational interests using childrens' data for advertising purposes.

75 percent
of parents disapprove of collecting student information and tracking students online for marketing or advertising.

90 percent
of parents want school boards to expressly ban free e-mail services from using children's e-mail for advertising purposes.

87 percent
of parents want school boards to insist on removing advertising functionality from e-mail software.

According to a recent report, nearly 90 percent of voters (not all of whom were parents) said they are "very" or "somewhat" concerned about non-educational interests using their children's data

[24] *See Notice* at ¶¶ 271-275.

for marketing and advertising purposes.[25] Another survey revealed that 75% of parents disapprove of collecting student information and tracking students online for marketing or advertising,[26] and 90 percent of parents want schools to ban free e-mail services from using children's e-mail for advertising purposes.[27] Yet, at the same time, roughly 60 percent of parents don't know how schools collect and store their children's data online or whether non-educational institutions (*e.g.*, private companies) were involved.[28]

Existing federal laws have failed to keep pace with technological change nor do they adequately protect the privacy of student data as third party-operated cloud-based services are increasingly deployed in schools. The Children's Internet Protection Act ("CIPA"), with which E-rate participants must certify compliance, primarily addresses controls over content that students are able to view (*e.g.*, preventing access to pornographic websites);[29] it does not govern the collection and use of student data. The Family Educational Rights and Privacy Act (FERPA),[30] which was passed in the 1970s to protect the privacy of students' "personally identifiable information" in "education

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[25] *See National Poll Commissioned by Common Sense Media Reveals Deep Concern for How Students' Personal Information Is Collected, Used, and Shared*, Press Release (Jan. 22, 2014), *available at*: <http://www.commonsensemedia.org/about-us/news/press-releases/national-poll-commissioned-by-common-sense-media-reveals-deep-concern> (Common Sense/Benenson Student Privacy Study Press Release).

[26] Brunswick Insight and SafeGov, SafeGov 2012 National Data Privacy in Schools Survey at 6 (Jan. 2013), *available at* <*http://www.safegov.org/2013/1/8/safegov-2012-national-data-privacy-in-schools-survey*>.

[27] Brunswick Insight and SafeGov, SafeGov 2012 National Data Privacy in Schools Survey at 9 (Jan. 2013), *available at* <*http://www.safegov.org/2013/1/8/safegov-2012-national-data-privacy-in-schools-survey*>.

[28] *See* Osborne, Charlie, "Parents Want Transparency from Schools Concerning Use of Student Data," ZDNet (Jan. 23, 2014) ("[M]any parents -- six in ten -- said they were in the dark over how their local schools collect and store such data online, and whether private companies were involved."), *available at* <http://www.zdnet.com/parents-want-transparency-from-schools-concerning-use-of-student-data-7000025493/>.

[29] 47 C.F.R. § 54.520.

[30] 20 U.S.C. § 1232g.

record[s]" has become antiquated and fails to include needed governments requirements or meaningful enforcement, leading one leading privacy academic to observe that "[t]he greatest threat to children's privacy is schools."[31] A recent study conducted at the Center on Law and Information Policy (CLIP) at Fordham Law School concludes that schools are struggling to meet existing legal and regulatory requirements to protect student data. According to the study, many contracts that schools execute with cloud services fail to include even basic requirements how student data will be protected, used, or disclosed.[32]

- None of the school data analytics contracts reviewed as part of the study specifically prohibited the sale and use of children's information for marketing purposes.[33]
- For those contractual clauses that prohibited or limited redisclosure of student data, the ambiguity of the contractual language often permitted third party vendors to engage in mining and sales of student data without school district approval or parental consent.[34]
- None of the schools' third party data agreements that were reviewed required the school district to obtain parental consent before transferring student data to a third-party vendor.[35]
- Only one agreement studied required an option for parents to opt-out if they did not want their child's data collected by the third party vendor. The study notes that "[t]his is problematic, as the parental rights to notice and consent to the transfer of student information are central tenets of FERPA . . . ."[36]

Lawmakers and regulators must begin to take action as the educational use of cloud services increases. Indeed, Senator Edward Markey, in an October 2013 letter to Education Secretary Duncan, questioned whether the technology vendors' collection and use of students' data was being properly

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[31] Solove, Daniel J., "Why Schools Are Flunking Privacy and How They Can Improve" (Dec. 16, 2013), *available at:* <http://www.safegov.org/2013/12/16/why-schools-are-flunking-privacy-and-how-they-can-improve> ("Solove on Improving Student Privacy").
[32] Reidenberg, Joel R.; Russell, N. Cameron; Kovnot, Jordan; Norton, Thomas B.; Cloutier, Ryan; and Alvarado, Daniela, "Privacy and Cloud Computing in Public Schools" (2013). *Center on Law and Information Policy*. Book 2, *available at:* <http://ir.lawnet.fordham.edu/clip/2> ("CLIP Privacy Study").
[33] *Id.* at 29, 35.
[34] *Id.* at 29-30.
[35] *Id.* at 35, 39-40.
[36] *Id.* at 40.

conducted and overseen.[37] Senator Markey subsequently announced that he would introduce legislation to strengthen student privacy protections, including by barring vendors from using student data for commercial purposes.[38] In addition, some state legislators are responding to the need for stronger protections against the use of student data for advertising and marketing purposes.[39]

The digital education activities that the E-rate program is encouraging will be powerful tools in empowering America's students – but they also will expand the circumstances in which data can be collected about children and their use of online services. Schools are generally concerned about protecting student's privacy and, indeed, there is a means of obtaining the needed services while protecting students' privacy: many third-party providers in the marketplace today offer broadband connectivity and related eligible services at affordable rates without seeking to mine student data for marketing and advertising purposes.[40] The problems highlighted in the CLIP Privacy Study most likely result from inadvertence, not malevolence.[41] Regardless of who is to blame, student data and

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[37] Letter from Sen. Edward J. Markey to the Hon. Arne Duncan, Secretary, U.S. Department of Education (Oct. 22, 2013), *available at:* <http://www.markey.senate.gov/documents/2013-10-22_FERPA.pdf>.

[38] *See* Nagel, David, "Student Data Not a 'Product' To Be 'Sold to the Highest Bidder,'" *t|h|e Journal* (Jan. 14, 2014), *available at*: <http://thejournal.com/articles/2014/01/14/student-data-not-a-product-to-be-sold-to-the-highest-bidder.aspx>.

[39] *See, e.g.,* Singer, Natasha, "Scrutiny in California for Software in Schools," New York Times (Feb. 20, 2014) (California Senator Steinberg introducing legislation to prohibit education-related websites, online services, and mobile apps from using personal student information for commercial purposes), *available at*: <http://www.nytimes.com/2014/02/20/technology/scrutiny-in-california-for-software-in-schools.html?_r=0>.

[40] *See, e.g.,* eChalk Comments at 3 ("While there are free services, the privacy policies are unacceptable to many, including 36 State Attorney Generals [sic] who expressed their concerns to Google in 2012 and went large[ly] ignored. The willingness of consumers to sell their identity for free services is one thing. The willingness of our schools to do the same with minors is entirely another. Without E-rate funding to allow for smarter purchasing, poorer schools will be faced with no choice other than to offer services which put students' identities at risk while the wealthier schools can choose companies that, for a modest fee, pay to protect their students.").

[41] *See, e.g.,* Solove on Improving Student Privacy ("It would be wrong to blame the schools. They are bombarded with tons of dire issues they need to address and many state and federal mandates. They

student privacy should not be for sale, whether by schools, cloud service providers, or anyone else. Nor should schools be presented with the Hobson's choice of selling their students' privacy in exchange for affordable broadband services. It is only reasonable and appropriate for the Commission's E-rate program to ensure that data collected about students and their use of online services will not be made available for use by third parties for advertising or marketing purposes – and to provide a structure for doing so that will help schools comply with their responsibility to protect student data.

Microsoft firmly believes that new generations of cloud-based technology offer great potential in schools, from lowering costs to providing anytime-anywhere learning opportunities to readying students for jobs where an increasing number of cloud technologies will be in use. Yet, one of the more troubling findings in the CLIP Privacy Study is that the cloud contracts analyzed by the Fordham research team often lacked basic terms related to the handling and protection of student data accessible by the service provider.[42] In order to protect America's students as they take advantage of digital learning and successfully prevent the deliberate or inadvertent violation of student privacy, Microsoft recommends the following:

- Implement a rule that prohibits E-rate program participants and funding recipients from allowing third-party use of student data for purposes of marketing or advertising and require annual certification of compliance with this obligation.

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remain in the Dark Ages on privacy because they have been left behind."), *available at*: <http://www.safegov.org/2013/12/16/why-schools-are-flunking-privacy-and-how-they-can-improve>.

[42] *See, e.g.,* Natasha Singer, "Schools Use Web Tools, and Data Is Seen at Risk," New York Times (Dec. 12, 2013)(quoting Kathleen Styles, Chief Privacy Officer of the U.S. Department of Education, as saying "[t]he report raises the possibility that abuses could happen with student data if contracting practices don't come up to snuff."), *available at* <http://www.nytimes.com/2013/12/13/education/schools-use-web-tools-and-data-is-seen-at-risk.html?pagewanted=all&_r=1&>.

- Create contractually enforceable protection for students by requiring contracts for E-rate-covered products and services to include specific terms preventing third-party vendors from using or selling student data for marketing or advertising purposes. In order to promote its proposed third goal for the E-rate program of streamlining administration of the Fund,[43] the Commission could provide sample or model language that schools could easily insert into relevant contracts.[44]
- Keep digital activities at school safe by requiring education-specific licensing for E-rate covered products and services. For example, Microsoft offers an education-specific volume licensing agreement that is distinct from consumer terms of use. This means that a student's use of school-purchased products and services will be walled off and safe from any non-school online activity and that non-school online practices won't undermine the protections afforded in the educational environment.

VII. FACILITATING THE USE OF ALTERNATIVE INTERNET CONNECTIVITY TECHNOLOGIES

The Notice asks whether technologies other than fiber can provide efficient and cost-effective ways to provide service to schools,[45] and whether the Commission should prioritize fiber connectivity over other forms of connectivity.[46] Microsoft certainly supports fiber connectivity, but recognizes that it may be too expensive for very remote schools or more than is needed for very small schools. Prioritizing fiber connectivity over other technologies could disadvantage those remote and small schools that can obtain the desired level of broadband connectivity in more economical ways than purchasing or leasing fiber connections. Schools should have the flexibility to make trade-offs (*e.g.*, cost versus bandwidth) in deciding which method of connectivity to employ without being disadvantaged by the rules of the E-rate program.

Technological developments are likely to make the use of TV white spaces or other unlicensed spectrum an attractive alternative for connecting schools, or for schools to utilize for purposes of

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[43] *See Notice* at ¶ 45.
[44] The Commission has suggested language for regulated entities to use in a variety of contexts, such as in bounce-back 911 texts. *See Facilitating the Deployment of Text-to-911 and Other Next Generation 911 Applications; Framework for Next Generation 911*, Report and Order, 28 FCC Rcd 7556, ¶ 69 (2013).
[45] *Notice* at ¶ 67.
[46] *Id.* at ¶ 77.

internal connections. In addition to offering nomadic connectivity, Super WiFi has propagation advantages over traditional WiFi (*e.g.*, substantially greater range and ability to pass through walls) that lends itself to being an optimal method of connecting remote schools and libraries or, alternatively, providing connectivity within a school or library.

- In Kenya, for example, Microsoft – in conjunction with the Kenyan Ministry of Information and Communications and the local ISP -- deployed a pilot project called "Mawingu" (Kiswahili for "cloud") to deliver wireless high-speed broadband Internet to schools in areas currently lacking even basic electricity using TV white spaces and solar-powered base stations.[47]

- Similarly, at the World Economic Forum on Africa in May 2013, Microsoft announced a pilot partnership with the Tanzania Commission for Science and Technology (COSTECH) and a local Internet service provider to offer affordable wireless broadband, utilizing TV white spaces, to students and faculty at the University of Dar es Salaam.[48]

- In July 2013, Microsoft announced a joint pilot between Microsoft, the Council for Scientific and Industrial Research, the University of Limpopo, and local network builder Multisource to use TV white spaces and solar-powered base stations to provide low-cost wireless broadband access to five secondary schools in remote parts of the South African Limpopo province.[49]

- Closer to home, Microsoft participated in the first U.S. deployment of TV white spaces in Claudville, Virginia which included providing broadband connectivity to a school. In 2009, Microsoft partnered with Dell and Spectrum Bridge to use TV white spaces to connect Claudville's post office, several businesses and homes, and Trinity Christian School to the town's fiber optic backbone under an experimental license granted by the Commission.[50]

In light of the foregoing cost and technical advantages and proven ability to use this technology to deliver broadband connectivity to remote schools, the FCC should encourage Super WiFi connectivity by including white spaces equipment on the Eligible Services List once the equipment becomes certified in the United States. Further, the Commission should ensure that its prioritization policies do not discourage adoption of this broadband solution. Finally, the Commission

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[47] For a video of this project in action, please visit<http://www.microsoft.com/africa/4afrika/white_spaces_project.aspx>.
[48] *See* <http://www.microsoft.com/en-us/news/press/2013/may13/05-08tanzaniapr.aspx>.
[49] *See* <http://www.microsoft.com/en-us/news/press/2013/jul13/07-274awhitespacespr.aspx>.
[50] *See* < http://www.businesswire.com/news/home/20091021005394/en/White-Spaces-Network-Brings-Broadband-Internet-Rural#.UvLM_I2YaUk>.

should continue to consider the potentially significant educational benefits from unlicensed spectrum use when exercising its spectrum assignment responsibilities.

VIII. CONCLUSION

Microsoft looks forward to continuing to work with the Commission, educators, and industry participants to develop a more effective E-rate system that empowers America's students by encouraging more broadband connectivity, promoting smarter bandwidth usage, implementing E-rate priorities that reflect modern technological capabilities, protecting the privacy of students in a digital education environment, and promoting alternative, low-cost/high-quality connectivity technologies.

Microsoft

Empowering America's Students

APPENDIX

Microsoft's commitment to education is illustrated by its meaningful involvement in a variety of education-related programs and initiatives, including the following.

I. THE CONNECT-ED INITIATIVE

In the most recent State of the Union address, President Obama named Microsoft as one of the companies that is helping to connect more than 15,000 schools and 20 million students over the next two years. Specifically, Microsoft pledged $1 billion in savings and support over the next year alone towards bringing affordable technology to students. That pledge includes making Windows-

Microsoft pledged
ONE BILLION DOLLARS
in savings and support over the next year
to bring affordable technology to students in support of the ConnectED initiative

Deeply discounted Windows-based devices (Windows licenses for $1)

Over 12 million FREE copies of Microsoft Office

Free IT skills training and certifications, including $1 million for exam fees

Financial support for EveryoneOn to provide $10/mo. unlimited home broadband connections

based devices substantially more affordable by deeply discounting the prices of the Windows operating system for school-destined products. Microsoft also is providing more than 12 million copies of Office available to students for free. Further, for the roughly 2000 at-risk designated schools in the U.S., Microsoft is giving away our IT Academy program for IT skills training and certifications and is donating over $1 million to cover certification exams for students from these

schools.[1] Finally, Microsoft provides financial support to its non-profit partner EveryoneOn which offers home Internet service for as low $10 to the 36 million Americans living in communities with low median incomes.

II. TECHNOLOGY EDUCATION AND LITERACY IN SCHOOLS (TEALS) PROGRAM

TEALS is a grassroots Microsoft employee-driven program that recruits, mentors, and places high tech professionals who are passionate about digital literacy and computer science education into high school classes as part-time teachers in a team teaching model where the school district is unable to meet their students' computer science needs on its own. TEALS works with committed partner schools and classroom teachers to eventually hand off the computer science courses to the classroom teachers with whom we team teach. The school will then be able to maintain and grow a sustainable computer science program on its own.

In the 2013-2014 school year:

- 25 percent of TEALS students were female (two times the industry average)
- 28 percent of TEALS students were under-represented minorities (five times the industry average)

Although TEALS first began working only with school districts in Washington State, the Microsoft program has expanded to a total of eight states in 37 schools across the country, reaching approximately 1,500 students in the 2013-2014 academic year. One of the students that TEALS reached outside of Washington was Jeremy Moore.

Jeremy Moore was born into born into a working-class family in Beattyville, a rural Kentucky town where jobs—let alone jobs in the tech field—are hard to come by. Beattyville is just 2 square

[1] According to a 2012 IDC Research report, roughly 25 percent of U.S. IT jobs remain unfilled due to lack of training, certification, or experience.

miles with plenty of dirt roads. Its population is about 1,300—the same as it was in 1910. Coal production once made up a significant portion of the economy but has suffered in recent years. Unemployment is higher than 12 percent.

Isaac Wilson, a Microsoft software developer, is using his technical knowledge as a Microsoft software developer to teach computer science to students like Jeremy in school districts that couldn't otherwise afford to offer such courses. Isaac volunteered to teach Jeremy's class remotely on top of his full-time job at Microsoft, spending five hours a week teaching and many more weekend hours on preparation.

Before TEALS, Jeremy's grades were not a priority and college was not in the picture. His mom, Tammy Moore, said she saw a complete turnaround in her son after he started the class. Jeremy went from dreading school to rushing to third period for his TEALS class. With technical knowhow, guidance, and encouragement from Isaac, Jeremy made the honor role at his high school, graduated, enrolled in a community technical college, and plans to transfer to a four-year university where he can study computer science. Tammy Moore states that "I'm very thankful to Microsoft and the people at our school who brought the program here. It changed Jeremy's life."

This video demonstrates the life-altering influence that Microsoft's TEALS program has had on Jeremy, a program that would not have been possible without use of a broadband connection, computers in the classroom, and communications software like Lync.

http://www.microsoft.com/about/corporatecitizenship/en-us/youthspark/spotlight/jeremymoore/

III. SKYPE IN THE CLASSROOM

Approximately 75,000 teachers are using Skype in the Classroom, which is free, with their broadband connectivity to take virtual field trips to anywhere in the world, invite guest speakers into the classroom -- an author, a scientist, an artist, a government official -- and to collaborate with other classes no matter where they are. This dynamic program greatly expands the universe of students' learning resources and engagement in cultural, scientific, and civic affairs. Skype makes it possible for students in China to practice language skills and share customs with school children in Chicago, for NASA scientists to show students firsthand how to prepare a space vehicle for takeoff, and for students even in the remotest areas to enjoy lessons prepared by world experts on a wide variety of topics from volcanic geology to exploring the Amazon rainforest to marine biology. And, a fourth grade class at Agnes Risley school in Sparks, Nevada set up Skype video calls in their classroom (using a donated laptop and donated broadband connection) so that a student who was kept home from school due to treatments she was undergoing for leukemia could be included in the classroom and not fall behind.

> Iowa Governor Brandstad's office began a "Skype Your School!" program consisting of 20-minute conversations between the Governor's office and a single classroom of students via Skype. Governor Brandstad explained: "We get to hear questions straight from the students and create a real dialogue about education and the future of education in our state....The students are surprisingly uninhibited. We get questions about all kinds of issues from 'What is the most difficult decision you have had to make as governor?' to 'What resources are available for us to put in a wind turbine to power our school?' to 'What did you learn in school that helped you to become a governor?'"

http://learningismessy.com/blog/?p=196

IV. YOUTHSPARK

YouthSpark is a Microsoft global initiative to create opportunities for 300 million youth over three years. Through 30+ programs and partnerships with 186 youth-serving nonprofits, in its first year alone Microsoft YouthSpark created new opportunities for more than 103 million young people in over 100 countries around the world. Although there is much still to do, we're inspired by what we've seen: young people taking the lead in changing not only their lives but the lives of others around them, making a real impact in their local communities and on the global stage.[2] Through YouthSpark, Microsoft provides cash grants to eligible organizations whose missions and activities support youth development. Microsoft also donates software and services to a broad array of eligible nonprofit organizations.

V. MICROSOFT PARTNERS IN LEARNING

Through the Microsoft Partners in Learning program, Microsoft helps educators and school leaders connect, collaborate, create, and share so that students can realize their greatest potential. The Microsoft Partners in Learning program is multi-faceted.

- *Schools Program.* In conjunction with other education experts from around the world, Microsoft is developing new approaches and materials that any school or school system can use and the critical leadership development necessary to help students achieve their full potential. To connect school leaders around the world, Microsoft has created a global community on the Partners in Learning Network where school leaders with common interests

[2] Microsoft's Imagine Cup is another element of YouthSpark. Microsoft's 2013 Imagine Cup winners included four Ukrainian students who developed a glove which can be used for phone calls or face–to-face conversations, combine sensors on the fingers with a controller that analyzes hand motions in the air, compares them to a library of sign language, and then generates the verbal equivalent of the sign through a smartphone. <http://www.microsoft.com/about/corporatecitizenship/en-us/youthspark/spotlight/team/>.

can share their experiences and connect with one another. Microsoft encourages members of the global community to organize local school communities, visits to other Partners in Learning Schools, hold local workshops, and share best practices.

- *Envisioning Workshops.* Envisioning workshops sponsored by Microsoft help educators develop, refine, and share an educational vision to support new initiatives, policies, or reforms.
- *Peer Coaching.* The peer coaching system trains teacher leaders to serve as peer coaches for their colleagues. The program was developed at the Puget Sound Center for Teaching, Learning and Technology as part of a U.S. Department of Education grant in 2002. Then, in 2004, Microsoft licensed the curriculum. Since its inception, Peer Coaching has trained teachers in 47 countries and across the United States.
- *Virtual University Seminars.* To provide school leaders with skills necessary to lead change, Microsoft offers professional development through recorded seminars given by education experts from around the world.
- *Microsoft Innovative Schools Toolkit.* Microsoft offers a free Innovative Schools Toolkit, an accessible and practical guide for school communities to begin the journey of innovation, offering a process that can be customized to the unique needs of each community.[3]

VI. BING FOR SCHOOLS

A November 2012 Pew Poll study found that 94 percent of teachers believe their students are very likely to use a search engine in a typical assignment. Recognizing the importance of search engines to a student's studies, Microsoft developed a free education-specific product using its Bing

[3] <http://www.is-toolkit.com/index.html>.

search engine. Bing for Schools offers K–12 public and private schools in the U.S. the choice to avoid the commercialization of student Web searches performed on the school network by removing all advertisements from search results. Bing is the first and only major search engine to give schools such a choice. It also enhances privacy protections, sets strict filters to help block adult content, and adds specialized learning features to promote digital literacy, such as offering three learning activities every school day, targeted at kindergarten through fourth, fifth through eighth, and ninth through 12th grades which are free, aligned with Common Core State Standards, and use the Bing homepage image of the day to pose a critical-thinking question that can be solved using search tools. In addition, parents can sign up for Bing Rewards (earned from their use of the Bing search engine) and donate those rewards to a chosen school which, in turn, can redeem those points for free Surface tablets for the classroom.

VII. IN-HOME BROADBAND CONNECTIVITY

Broadband as a critical component to connected learning. Microsoft's non-profit partner EveryoneOn is offering home Internet service for as low as $10 to the 36 million Americans living in communities with low median incomes. Home broadband Internet access allows students to complete Internet-based homework and stay connected with teachers and classmates after school. Because about a third of Americans lack broadband at home, Microsoft and EveryoneOn are helping to bridge that gap by providing low-income families with affordable options.[4]

[4] To learn more about EveryoneOn and its exciting programs, please visit <www.everyoneon.org>.