­­­­­Rethinking Education in the Age of Technology: The Digital Revolution and Schooling in America, by Allan Collins and Richard Halverson

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Book Review

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# Introduction

The purpose of this paper is two-fold: synthesizing the main argument of Collins and Halverson (2018), and discussing unsolved problems from the perspective of educational leadership.

# Understanding & Summary

The main argument of Collins and Halverson (2018) is to emphasize the urgency of seeking a coherent model for the future of education in the age of technology. Similar to Firestone and Riehl (2005), Collins and Halverson (2018) have not proposed solutions for the tensions between the public schooling system and the affordances of the digital revolution. Instead, they share a concise history of schooling in America and offer a compelling observation of how Generation Z (i.e., the new generations after the popularity of the Internet and other digital technologies) learn. Collins and Halverson (2018) hope their work will be helpful for "another Horace Mann to provide the vision for an educational system that can integrate all the different elements that are developing" (p. 141).

Collins and Halverson (2018) provide four main reasons to support their arguments. **First, the systematic transformations of education are not unique in history.** For example, the Industrial Revolution, in the first half of the 19-century, led to the educational transformation from a system of apprenticeship into universal schooling. Similarly, the Digital Revolution is leading Generation Z to lifelong learning (i.e., ongoing and self-motivated pursuit of knowledge with the help of digital technologies). Comparing the three eras of education (i.e., apprenticeship, industrial, and information era), Collins and Halverson (2018) summarize the evolution of education in six main aspects: *responsibility* (from parents to the state, and to the individual and parents), *assessment* (from practical skills to necessary skills and disciplinary knowledge, and to generic skill and learning to learn), *pedagogy* (from apprenticeship to didacticism, and to interaction), *location* (from centered at home to centered at school, and to centered at multiple venues), *culture* (from adult culture to peer culture, and to mixed-age culture), and *relationship* (from personal bonds to authority figures, and to computer-mediated interactions). With time, these pieces might come to make up the fragments of a new system of education. They do not yet form an equitable and coherent system of education for the future of education in the age of technology. Thus, it is necessary to seek a new education system.

**Secondly, the revolution in education is inevitable and happening.** Even though the schools are still prevalent all over the world, we continue to see *seeds* of a new education system emerge. Collins and Halverson (2018) summarize nine *seeds* which provide new setting for learning outside the classroom: *home school*, *workplace learning* (e.g. Accenture, Xerox, and LinkedIn.com), *adult education*, *distance education* (e.g. Open University in British), *learning centers* (e.g., Kaplan and Sylvan), *computer games* (e.g. SimCity and Civilization), *web communities* (e.g., AniméMusicVideo.org and xanga.com), *technical certification* (e.g. Microsoft and Cisco), and *internet cafes*. Beyond these seeds, the popularity of digital media (e.g., YouTube), social networking (e.g., Facebook), online bookmarking (e.g., Twitter), and other Web 2.0 applications also gradually change the way how Generation Z accumulate and share the knowledge. These *seeds* of new education system keep forcing us to redefine the identification of schooling with learning and review the role of schools in education.

**Thirdly, the conventional schooling system is struggling to adapt to new technologies.** The deep incompatibilities between schooling and practical needs from social development are becoming obvious once again. The de-centralized and self-directed tendencies in the digital revolution are not just fad but basic human competence (Knowles, 1978), where learners are in control of deciding what to learn and how to learn, aligns with the notions of libertarian individualism (Brookfield, 2006). As the current 'one best system' (Tyack 1974) began to take shape, it became less tolerant of fundamental changes to core practices (Collins & Halverson, 2009). People started realizing that grouping children together into the public school based on their age and providing the "one-size-fits-all" solution for education do not work for everyone. Collins and Halverson (2018) summarize six main incompatibilities between schooling and information technologies: *uniform leaning vs. custom learning, teachers as expert vs. diverse knowledge source, standardized assessment vs. specialization, knowledge in the head vs. reliance on the outside resource, converge vs. knowledge explosion,* and *learning by absorption vs. learning by doing*. Thus, it is time to think about how to help schools adapt to the new technologies.

Finally, what if we do nothing?As with any revolution, there will be both gains and losses. **If we do nothing, we may see either loss the opportunities or ignore the risks.** There are three biggest risks for the digital revolution in education. Firstly, despite widespread tracking and segregation, public schools have acquired acceptance as the institution that can foster **social and economic equity** (Reyes & Wagstaff, 2005). Beyond public schools, rich families today could give their children a better education with many other options (e.g., homeschooling and distance education). While, the lives of the economically disempowered are likely to suffer the most, public schools may become little more than the institutions of last resort. Secondly, education is more likely to become a gambling game of **commercialization**. The learning resources that we can obtain from the Internet are unbalanced. For example, much more courses about finance, marketing, computer science, and data science are available on Coursera (an online learning platform), compared with subjects like music, dancing, history, and philosophy. Facing the overwhelming and sometimes misleading information, parents and students may lack the ability to identify the information which is most suitable and useful for themselves. Finally, the digital revolution increases divisions in society. Because people usually only pick information that they want to see. Gradually, it becomes harder for Generation Z to have the sympathy and the values which are usually shared with every American regardless of their diverse background. Unfortunately, this tendency is even reinforced by the recommendation system and social network. Thus, **citizenship** **and social cohesion** are facing the challenges.

There are also five benefits to the digital revolution in education. Firstly, education could be more **engaging** since learning is directed towards what people want to learn. People choose courses, videos, or games that reflect their interests. Thus, they have more motivation and initiative. Secondly, new technologies promote the **personalization** of learning. For example, digital environments can adapt to the level of the student’s ability and provide timely feedback. Individualized learning resources can also be recommended to every student. Thirdly, customization of learning also allows students to cultivate and pursue their own learning goals with **less competition**. Personalized learning goal facilitates intrinsic motivation may surmount the sense of failure that comes when everyone is supposed to learn the same thing and take the same standardized tests. Fourthly, **responsibilities are shared** with the families who school their children outside classroom. Parents are required to play a more active and leading role in their children’s education. The problems which are not solved in school can be discussed in other learning environments (e.g., distance education and learning communities). Finally, the **peer culture** is redistributed through web communities, which create spaces for students to participate in interest-based affinity groups. These groups can provide opportunities for students to develop peer groups that reorient peer cultures around legitimate learning goals. Consequently, instead of ignoring all the technologies that are developing, we should take a cautious, and an open-minded attitude towards the digital revolution in education.

# Conclusion & Synthesis

Collins and Halverson (2018) highlight the complexity of education in the digital revolution and the urgency of seeking a coherent model for the future of education. To seek this model, we need to figure out what role should school leaders play during this revolution of education.

**The first question to which school leaders should know the answer is:** **what is the nature of learning in the age of information?** Prestine and Nelson (2005) summarize the nature of learning with the three major tenets of cognitive learning theory (Resnick, 1989): (1) learning is a process of knowledge construction, (2) knowledge is self-dependent (i.e, knowledge is developed based on the previous knowledge), (3) learning is a social activity situated in a specific context and environment. Based on these understandings of learning, it is important for the school leaders to focus on improving teaching and learning (Prestine & Nelson, 2005) and incorporating communities (e.g., professional community, neighborhood community, and student community) for effective learning (Dirscoll & Goldring, 2005).

Though new technologies may provide new vehicles for knowledge development, it does not change the nature of learning. Learning is still “not something that can be given or handed to some else” (Firestone and Riehl, 2005; p. 47). The fundamental problem for education is still about how to help every student to obtain the ability, the resource, and the environment to complete the instructional process of knowledge development continuously and comprehensively. Meanwhile, school leaders should be aware of the new challenges these new technologies may bring. For example, some questions that arise are: will the overwhelming resources available online indeed help learners to remediate the gaps in their learning, or leave more unsolved issues? Will their self-directed choices help them to achieve more successful futures, or lure them into quick-hit, superficial, and highly suggestible learning experiences? As long as the nature of learning is not to change, educational leaders still need to seek the best way to improve teaching and incorporate the community for learning under different contexts.

**The second question that school leaders should know is: what is the goal of school in the age of technology?** The history of public school in America started from Horace Mann’s belief that “education, then, beyond all other devices of human origin, is the great equalizer of the conditions of men, the balance wheel of the social machinery.” His work then has been fueled by national concerns about the low achievement of America students (with the release of *A Nation at Risk* in the 1980s), and recently exemplified in the *No Child Left Behind* legislation. The basic goal of the school is always serving diverse student populations to support their achievement, equity, and justice (Leithwood & Rihel, 2005).

Reyes and Wagstaff (2005) argued that “the most critical challenge to educators today is to educate successfully student populations that are ethnically and linguistically diverse and those groups whose educational needs have not been met” (p. 106). As we think about educational leadership and the rapid development of technology, this task is still not solved. Meanwhile, the schooling system provides unique functions of education, which are not fully considered by the new technologies. For example, school still plays an important role in promoting and supporting social justice and democratic community for diverse students (Furmaan & Shieelds, 2005). All of these functions of school cannot be comprehensively replaced by any new *seeds* of new education systems. Consequently, school leaders still need to cope with multiple and conflicting accountabilities (Firestone & Shipps, 2005).

**Finally, how could the school leaders make an impact on educational revolution?** Our current learning systems are in flux. The first issue is the how can school leaders implicate the new *seeds* of education into current school system? This is not an easy task, since “simply inserting technology into classrooms and schools without considering how the contexts for learning need to change will likely fail” (p. 140). To find the solution of how to help school leaders to be successful in the digital revolution, we want to emphasize one potential breakthrough: evidence-based improvement cycle (Bowers, Bang, Pan, & Graves, 2019). The field of education is already in the midst of data transformation: here are changes in standards, an increasing use of assessments, and a growing demand to measure performance, all of which is driving the need for teachers and school administrators to work with data in new ways (Rouda, 2018). Data science technologies offers opportunities to use data to inform instructional practice, so that school system could improve their capacity in providing personalized, timely, and engaging learning experience to the students. However, school leaders should notice that reviewing data takes time and skill, and it is not straightforward to translate findings into changes in the classroom. Schildkamp, Poortman, and Handelzalts (2014) provide a theory that outlines a set of critical components that schools must have in place to meaningful engage in data reflection and learning, including purpose, data, information, knowledge, action, and outcome. Similarly, Halverson (2012) shows an example of a formative feedback system model that captures how school leaders and teachers structure artifacts and practices to create formative information flows across interventions, assessments, and actuation spaces. For data to inform decisions about policy, programs, practice, and student placement, there are still may open questions about how could school leaders support effective data use. Meanwhile, there are still many other possibilities for school leaders to make an impact on educational revolution. However, evidence-based improvement cycle in school may be the first step for the school leaders to embrace the future.

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