

Gifted students in the heartland: Who they are and why it matters

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Abstract

This study used a data collecting technique called Knowledge Discovery in Databases (KDD) to examine profiles of 109 gifted students in Nebraska who achieved perfect ACT and/or SAT scores between the years 2011 and 2016. The result of data analysis showed that most were white male students from private schools in urban areas. According to those talented students, achieving perfect test scores may be attributed to their hard work and/or multiple attempts. Compared to their school counterparts, the focus students were also comparatively well-rounded in terms of academic excellence and leadership in their schools' extracurricular activities and community service. Based on the findings, it is argued that nature and nurture are not mutually exclusive when it comes to gifted students; educators and other stakeholders can thus seek to not only nurture gifted students' natural abilities, but also to help build a strong academic work ethic and commitment to service to others.

Key words: gifted students, perfect test scores, high school students, educational data mining

Introduction

According to the U.S. Department of Education Office, there were an estimated 3.2 million public school students enrolled in gifted and talented programs in 2011–2012. However, the federal government has made little attempt to appropriately address the unique learning needs of students with gifts and talents (Council for Exceptional Children, 2018). In 2011, the U.S. Congress terminated all funding for the Jacob K. Javits Gifted and Talented Students Education Act, the sole federal program dedicated to supporting the needs of gifted students with high academic performance. In 2015, the Every Student Succeeds Act (ESSA), the reauthorization of the Elementary and Secondary Education Act of 1965 (ESEA), and the Talent Act (2017) were passed in support, without federal funding, of gifted education (National Association for Gifted Children, 2019). Under the current U.S. administration, gifted education has suffered

even more by having a budget cut of US \$12 million for gifted student services (Washington Post, 2017). The availability and quality of gifted education, therefore, is primarily in the hands of state legislators and school districts who often lack knowledge of gifted education. This results in a painful practice in that gifted education at the state level is frequently among many educational services targeted to be cut in times of budget constraint.

As a society, by not appropriately addressing gifted education and neglecting the unique educational needs of gifted students, we are increasing the excellence gap among students. Statistics from the Office of Civil Rights of U.S. Department of Education (2012) revealed that students who were of African American or Hispanic descent were disproportionately underrepresented in gifted and talented education programs nationwide. In addition, students from disadvantaged backgrounds were less likely to achieve at advanced levels on state and/or national assessments than their more advantaged peers, putting these students, and the nation as well, at a disadvantage to effectively compete in the global marketplace, and depriving them of an appropriate, challenging education (Council for Exceptional Children, 2018). Conversely, White, urban males have a high representation in being identified as gifted learners (58.2% White and 49.3% Male). There is also a misconception concerning the overrepresentation of Asian Americans, though there is not information to support this perception (Yoon & Gentry, 2011).

Gifted education is also affected by limited research to shed light on their characteristics and needs in order to help stakeholders have a better understanding of gifted education in order to provide appropriate support to gifted students. Forty years ago, President Ford (1978) called for more research efforts in the field of gifted and talented education, and in the last few decades more educators and researchers (Brody & Mills, 1997; Dai, Swanson & Cheng, 2011; Plucker & Callahan, 2014; Vu, 2011; Ziegler, Stoeger & Vialle, 2012) have repeated the call to conduct research in the field in order to meet the unique learning needs of students with gifts and talents.

To that end, this study aimed to examine profiles of gifted students with high academic performances. Specifically, it made an attempt to build a holistic picture of 109 gifted students in Nebraska with perfect ACT and/or SAT scores between the years 2011 and 2016. The goal is to understand these talented students and thus be able to meet their unique learning needs as well as nurture the next generation of talented students. We note that it is not our intent to join the conversation of whether gifted education is a manifestation of egalitarianism or elitism. It is our belief that all students should have equal access to a quality and challenging education,

based on their own unique learning needs, so as to develop their academic abilities to their highest potential.

Literature review

At the national level, as defined in the “No Child Left Behind” legislation (2001), “gifted and talented” students are defined as those “who give evidence of high achievement capability in areas such as intellectual, creative, artistic or leadership capacity, or in specific academic fields, and who need services or activities not ordinarily provided by the school in order to fully develop those capabilities” (Title IX, Part A, Section 9101 (22), p. 544). Similarly, the National Association for Gifted Children (2019, online) identified gifted students as:

those who demonstrate outstanding levels of aptitude (defined as an exceptional ability to reason and learn) or competence (documented performance or achievement in top 10% or rarer) in one or more domains. Domains include any structured area of activity with its own symbol system (e.g., mathematics, music, language) and/or set of sensorimotor skills (e.g., painting, dance, sports).

According to data from the Civil Rights Data Collection of Department of Education (2017), there were 3,329,544 public students enrolled in gifted/talented programs in the U.S. in 2013–2014. In terms of gender, male students who were identified as gifted accounted for 49.3% while female students accounted for 50.7%. In terms of race/ethnicity, White students accounted for 58.2%, Black for 9.9%, Hispanic for 18.0%, Asian for 9.6%, and American/Alaska Native for 0.8%.

At the state level, the Nebraska Department of Education has adopted the federal definition of gifted and talented students with an addition:

Learner with high ability shall mean a student who gives evidence of high-performance capability in such areas of intellectual, creative, or artistic capacity or in specific academic fields and who require services or activities not ordinarily provided by the school in order to develop those capabilities fully. (p.9)

In addition, the terms “high-ability learner” and “gifted and talented” are used interchangeably in Nebraska. According to statistics from College Board which administered the SAT test, the percentage of students earning a perfect score on the SAT is 0.018% (out of the 1.7 million students who take the test every year, only about 300 earn the highest possible SAT score). Likewise, according to data from American College Testing which administered the ACT test, the percentage of students earning a perfect score on the ACT is 0.14% (out of the 2,030,038

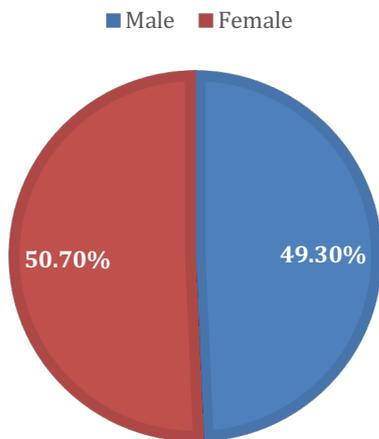
students who take the test, only about 2,760 get the highest possible ACT score). Arguably, based on the guidelines for gifted and talented students by the Nebraska Department of Education, high school students who achieved perfect scores in the SAT and/or ACT were considered gifted and/or talented.

The Nebraska Department of Education also published a guideline to help school districts identify gifted students by using a four-phase process utilizing planning, nomination, screening, and selection. Planning requires the creation of a committee to take responsibility for developing a plan to help in the identification of gifted/high ability learners. Nomination includes the student receiving the support to be considered for the gifted/high ability program from a variety of sources, including, but not limited to: teachers, school counselors, parents, community members, and even the student him/her self. Screening consists of the assessment or assessments to be utilized to determine if the student meets the state determined requirements for the gifted education program. Lastly, the committee makes the final determination, or selection of which students will become part of the gifted education program based on the total finding in the first three phases of the process (Nebraska Department of Education).

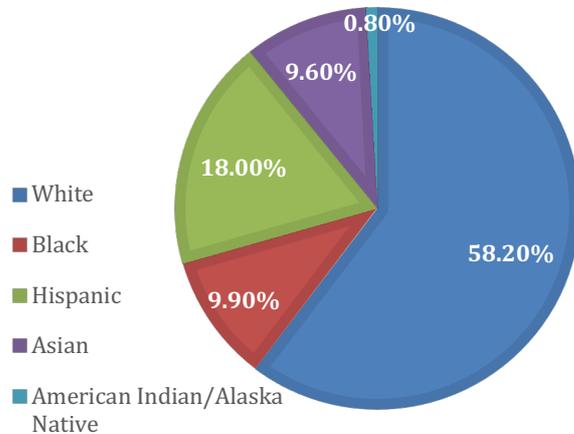
In 2013–2014, the number of identified gifted students in Nebraska public school systems was 36,647 out of 307,000 its total P–12 student population, accounting for 11.94% of students (National Healthcare Quality & Disparities Report, 2015). In terms of gender, male students who were identified as gifted accounted for 49.38% while female students accounted for 50.6%. In terms of race/ethnicity, White students accounted for 77.7%, Black for 4.6%, Hispanic for 9.9%, Asian for 3.9%, and American/Alaska Native for 0.7%. (Civil Rights Gifted Education Enrollment, 2013-2014) While the percentage of gifted students' gender in Nebraska proportionally mirrored the percentage of the U.S. gifted students' gender, the percentage of gifted students' ethnicity/race in Nebraska was different from the percentage of the national gifted population. However, that difference can be linked to the fact that White Americans represented 80.6% of the total Nebraska population, compared to 62% of the total U.S. population (Henry J. Kaiser Family Foundation, 2018).

Many studies have recently been conducted on gifted students' perceptions from different perspectives such as their non-gifted peers (Litster & Roberts, 2011), family members (Nicpon, Doobay & Assouline, 2010), teachers (Brighton, 2003; McHatton, Boyer, Shaunessy, Terry & Farmer, 2010; Wood, Portman, Cigrand & Colangelo, 2010) and themselves (Clinkenbeard, 2012; Rubenstein, Siegle, McCoach & Burton, 2012). Yet, there has been a lack of systematic

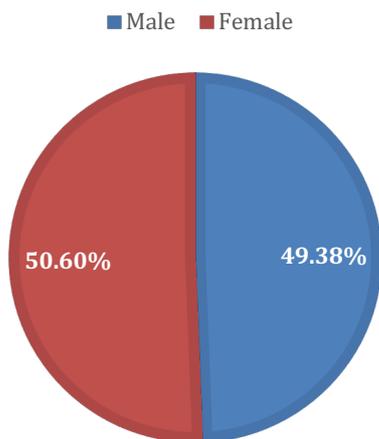
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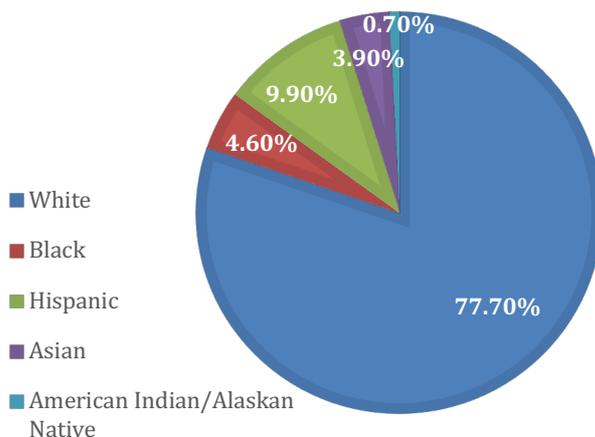
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and specific data to provide a more comprehensive picture of gifted students in terms of their demographics, academic performances, and behaviors. There are periodical statistics about gifted students that reveal this population’s demographic information as released by the Civil Rights Data Collection of the Department of Education, but there are few attempts to address concerns about the lack of systematic and specific data on gifted students’ profiles in the last decade.

In a research project examining the background of 90 gifted students at a gifted high school in Vietnam, Vu (2011) found that gifted students’ parents were highly educated and most of them

held bachelor's degrees and white-collar jobs. Students and families heavily invested time and financial resources to get admitted into the gifted program. In addition, connections to the school through relatives and acquaintances also played a part in the students' choice of the gifted program. Taking a broader view of gifted students' backgrounds, Lu, Li, Stevens and Ye (2017) examined the demographic information of 1349 gifted students in China, Germany, France, UK, Japan, Russia and USA, using data from the Student Questionnaire PISA 2009. The researchers observed that the percentage of gifted students' gender was nearly equal. The educational levels of their parents were found to be higher than those of non-gifted peers in all participating countries. Finally, gifted students were from families with economic, social and cultural status that was significantly higher than those of non-gifted peers in all seven countries.

Delving deeper in the profiles of gifted students in the US, Lubinski, Benbow and Kell (2014) tracked 1,650 intellectually talented 13-year-old students (1,037 males, 613 females) in the 1970s (1972–1974 and 1976–1978) who were in the top 1% of mathematical reasoning ability. Almost forty years later, the researchers examined those individuals' careers, accomplishments, psychological well-being, families, and life preferences and priorities, and found that their accomplishments far exceeded base-rate expectations.

In summary, there have been several attempts in the last few years to collect systematic and specific data about gifted students in terms of their demographics, performances, and behaviors. Those researchers helped shed light on several aspects of gifted students, but they also joined the call for more work on gifted students' motivations, needs, and performances in the context of culture, tradition, society, education, and institution. To that end, this research takes a focused approach by examining profiles of the top gifted students in Nebraska who earned perfect scores on either the Scholastic Assessment Test (SAT) or the American College Testing (ACT) between 2012 and 2017, and aims to provide information that can be used to help stakeholders such as school administrators, educators, counselors, parents, and researchers to identify and foster gifted students' talents.

Research Method

The researchers used data mining, also known as Knowledge Discovery in Databases (KDD). This method allows for extraction of information from a wide variety of publicly accessible databases (Baker, 2010). The specific strategy used was Educational Data Mining (EDM), or the gleaning of data from KDD to answer specific research questions pertaining to education. A feature of EDM is the researchers' ability to review and analyze student characteristics based on student models of the specific area of information being investigated.

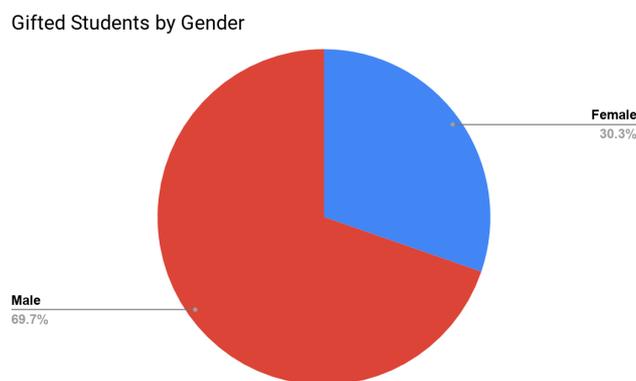
The specific focus of this research project was to examine gifted students' profiles in Nebraska. The researchers were interested in the perfect SAT or ACT scores earned between 2012 and 2016 by Nebraska students. The five main sources used for mining included: various websites from the Nebraska Department of Education and the Nebraska Government, local online newspapers, social network/media, and school newsletters.

By investigating a wide variety of data sources, researchers were able to triangulate and validate the data process, as well as filter, categorize, and analyze information during the data gathering process. News releases from the Nebraska Department of Education indicated that 109 students between 2011 and 2016 were honored by the Governor of Nebraska for earning perfect scores on either the SAT or ACT. These news releases provided students' names, gender, school, hometown and parents' names, which were confirmed on the Nebraska Government websites, schools' websites, and in local news outlets.

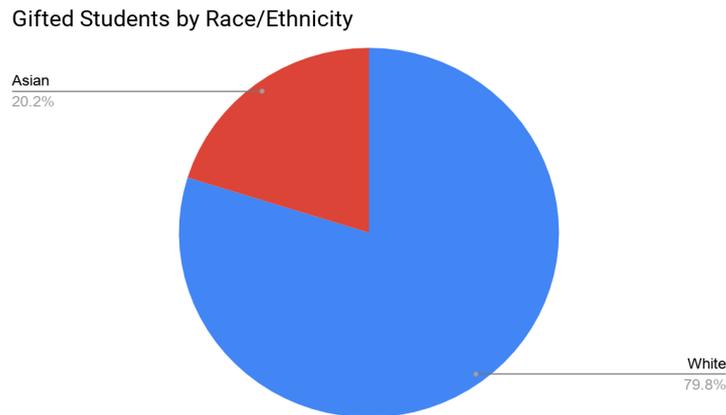
Results

Who are the gifted students in Nebraska with perfect SAT or ACT scores?

There were 109 gifted students in Nebraska who earned perfect scores on the SAT and/or ACT between 2012 and 2016. In terms of gender, 33 out of 109 students were female, accounting for 30.3%. 76 of them were male, accounting for 69.7%.



In terms of race/ethnicity, 87 out of 109 students were Caucasian American students, accounting for 79.8%. Twenty-two students were Asian American, accounting for 20.2%. It is noted that student demographics in Nebraska has more than two races/ethnicities. According to the National Center for Education Statistics (2017), public education enrollment by race/ethnicity in Nebraska between 2012 and 2015 was composed of 69.6% White, 16.8% Hispanic, 0.1% Hawaiian/Pacific Islanders, 6.7% Black, 2.2% Asian, 1.4% American /Alaska native, and 3.2% two or more mixed races.

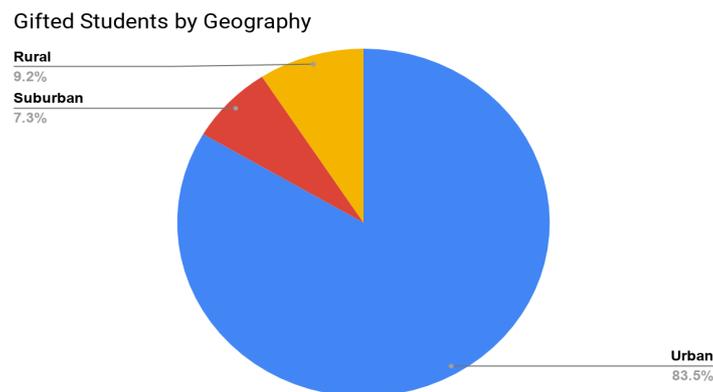


Where are they from?

Gifted students with perfect ACT or SAT scores in this project were from both public PK-12 schools and private schools in Nebraska. Between the 2012 and 2016 academic years, there were approximately 290,000 registered students per year in the Nebraska PK-12 public schools statewide (Nebraska Department of Education, 2017). According to a report by the Friedman Foundation (2016), there were approximately 33,768 registered students/year in private PK-12 schools in Nebraska. Combined, the Nebraska public and private school sectors served an estimated 323,768 students per year between 2012 and 2016. Our results showed that among 109 gifted students with perfect scores on either the SAT or ACT, 77 students were from public schools, accounting for 70.6%. 31 peers were from private schools, accounting for 28.4%. There was an exception of one student with a perfect score from a homeschool setting, accounting for 0.9%. These statistics indicate that the public school sector produced more gifted students with perfect SAT or ACT scores than its private school counterparts. However, the ratio of student population in public and private school sectors provides another perspective. Accordingly, the percentage of students in the private schools who received perfect SAT or ACT scores was 0.092% (31 out of 33,768 students) while the percentage of students in the public schools who received perfect SAT or ACT scores was 0.027% (77 out of 290,000 students). In other words, students in private schools were more likely to earn a perfect score than their peers in Nebraska public schools.

Regarding geography, according to the National Center for Education Statistics (2014), approximately 37.9% of all public school students in Nebraska attended schools in urban areas, and the remainder, 62.1%, attended schools in either suburban or rural areas. Rural is defined by the United States Census as “all population housing, and territory not included within an urbanized area or urban cluster” (2016). Our data revealed that 91 out of 109 students with

perfect scores were from urban areas, accounting for 83.5%. Ten of them (9.2%) were from rural areas and eight (7.3%) were from suburban Nebraska areas.



How did they earn the perfect scores?

Out of 109 gifted students with perfect SAT or ACT scores between 2012 and 2016, 98 (89.9%) individuals were featured in their hometown newspapers and/or school newsletters with student interviews and pictures. To find the answer to the question of “How did they earn the perfect scores?”, we looked to the rich data resources from those local newspapers and school newsletters. Our data analysis process consisted of examining and categorizing student responses in feature stories to address the purpose of the study. The feature stories were carefully analyzed through the coding process, including open coding, axial coding, and selective coding to make sure that we were targeting and collecting the right information. Two common themes emerged from student responses related to our question of “How did they earn the perfect scores?”: “Working hard”, and “Making many attempts”. According to students who achieved perfect scores on their SAT/ACT. According to the students “working hard” was one of the keys to their success. They spent their high school days in tough classes and studied hard. Most of them also joined state and national academic competitions and challenges. They also indicated that they made many attempts to reach the perfection level. Some took the test two times; others may have taken the test up to four times to achieve their perfect scores. Regardless, the full scores they obtain were not a “one-shot” performance.

How well-rounded they are?

In this project, a well-rounded student is understood as one who is academically prepared to achieve exceptional learning performances such as ACT/SAT scores, GPA, and class rank, and is active outside the classroom.

We examined feature stories of 98 students who took the SAT/ACT between 2012 and 2016, were determined to be well-rounded, as they also actively participated in school activities that were not academically focused. We found that they all actively participated in school athletic activities, music programs, and academic competitions at either state or national levels. Some of them took leadership roles in their school extracurricular activities; others served their communities.

In summary, our collected data helped paint a fairly comprehensive picture of gifted students with exceptional academic performances. They were predominantly White male students from private schools in urban areas. As previously stated, the students' ability to obtain perfect test scores may be attributed to their hard work and/or multiple attempts. Finally, they were considered to be "well-rounded" in terms of academic excellence and leadership in their school extracurricular activities and community service.

Discussion

Our research findings revealed that gifted students with perfect SAT/ACT scores in Nebraska were predominantly White male students (79.8% in term of race/ethnicity and 69.7% in term of gender). These figures do not reflect the proportion of race/ethnicity and gender representation of gifted students at either the national (58.2% White and 49.3% Male) or state (69.6% White and 49.4% Male) level. This disproportion of gifted student demographics in terms of race/ethnicity and gender may be explained by the fact the gifted students with perfect SAT/ACT scores included in this study were not limited to public school students and included private school students as well. The data of gifted student population collected by the US Department of Education and Nebraska Department of Education were from the public school sector only. However, it is still worth examining why male gifted students tended to perform better than female peers in these tests. The most remarkable contradiction lies in the minority group of gifted students identified as Asian. Asian American students (20.2%) were the only gifted student group that achieved perfect SAT/ACT scores in Nebraska, behind their White American peers, even though Asian American students accounted for only 2.2% of the student population in Nebraska public schools. This striking case of a disproportionate number of Asian American students getting perfect SAT/ACT scores echoed many well-documented phenomena of Asian American students' excellent academic performances nationwide (Hsin & Xie, 2014). Data released by the College Board, the administrator of SAT (2014), also confirmed that Asian American students tended to achieve higher scores than other ethnic groups, even their White American peers. There have been many attempts to investigate this

phenomenon. Some researchers speculated that Asian American students seemed to have higher cognitive ability (Sun, 2011). Other researchers argued that Asian American students were more likely to have parents who were educated, and more likely to live in stable two-parent families with higher incomes (Sakamoto, Goyette, & Kim, 2009). Another speculation was that Asian American students had a higher attentiveness and work ethic (Hsin & Xie, 2014). Within the scope of this study, we did not make an attempt to examine why Asian American students in Nebraska attained the accomplishment but rather offered a research suggestion for future study to look into this interesting finding.

Our results also indicated that students in private schools were more likely to attain perfect scores on the ACT or SAT than their peers in Nebraska public schools. In addition, students from urban areas in Nebraska outperformed their peers from rural and suburban areas. This finding was consistent with what the College Board found in its examination of student demographic background in which SAT scores were highly correlated with the income of students' families and their learning resources (Goldfarb, 2014). This finding likewise echoes many concerns about the inequalities in educational opportunities for students in rural and urban areas. However, our findings also posed a question of funding availability for gifted education programs. According to the data released by the Nebraska Department of Education (2018), the available funding for gifted education programs in Nebraska was approximately US\$2,300,300 per year while the total number of identified gifted students was 46,693. On average, each gifted student in Nebraska received US\$49.26 for his/her gifted education program. We could not track or identify whether private schools in Nebraska had any allocated funding resources for gifted students to be able to compare with the public school funding. For future studies, it would be useful for stakeholders such as legislators, school administrators, and parents to be informed about whether funding availability has any impact on the quality of gifted education programs in private and public schools.

Finally, achieving perfect SAT/ACT scores required gifted students to work hard and have a good academic preparation. In another words, their intellectual accomplishments were more likely from effort and hard work. This finding reflects what has been suggested by researchers and educators in the field of gifted education. For example, Clark (2011) asserted that no child was just born gifted, only with the potential for giftedness. Their giftedness was only realized through their hard work. Lastly, our findings confirmed what other researchers observed related to gifted students' positive perceptions of themselves and their social behaviors (Lee, Olszewski-Kubilius, & Thomson, 2012). Gifted students were rather well-rounded in terms of

academic excellence and leadership in their school extracurricular activities and community service. Based on our findings, it is argued that nature and nurture are not mutually exclusive when it comes to gifted students; educators and other stakeholders can thus seek to not only nurture gifted students' natural abilities, but also to help build a strong academic work ethic and commitment to service to others.

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Richard Meyer is Associate Professor and Chair Emeritus of Educational Administration at the University of Nebraska Kearney. He also has 40 years of experience in PK-12 schools as a teacher, curriculum and assessment director, and principal. He has worked with gifted programs as a teacher, administrator, and researcher.

Wendy McCarty is an Associate Professor in the Teacher Education department at the University of Nebraska Kearney, and Director of the Transitional Certification Program, an alternative pathway for post-baccalaureate students to pursue teacher certification in the state of Nebraska. She has been on the UNK faculty since 2002 and has had previous experience as a teacher in both public and parochial (sectarian) schools, as well as serving as Project Coordinator for a substance abuse prevention agency for sixteen years. Her research interests include professional development relative to differentiation of instruction, and alternative teacher certification routes.

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