Northstar Digital Literacy Assessments (NDLA)
First Look Technical Report

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Chapter 1: Introduction

This report describes technical characteristics and analyses in support of the use of the Northstar Assessments for practical and research applications. While the Northstar Digital Literacy Assessments (NDLA) is the product of over 12 years of development and use, with over eight million administrations to date, its technical and psychometrics properties have not been examined and reported for review by assessment specialists or the research community. A number of studies are underway to document evidence in support of making valid inferences from scores of participants who take the NDLA. In this first edition technical report, we describe the instruments in detail and present results of reliability and validity analyses.

Purpose & Audience

The NDLA comprises a set of standards-aligned, online, interactive assessments designed to evaluate adult digital literacy competencies at a fundamental level. Assessments are straightforward and user-friendly to facilitate comprehension and navigation by beginning digital users. Northstar assessments and programming are always available at no cost to learners. The Northstar Assessment System consists of 16 subtests[1] spanning Essential Computer Skills (6), Essential Software Skills (4), and Using Technology in Daily Life (6).

Northstar was developed in response to the needs of job seekers and other adult learners who may lack the digital literacy skills needed to seek, obtain, and retain employment, as well as to access education and perform other tasks in daily life. A secondary purpose of the assessments is to provide a means by which learners can demonstrate those skills to others, future employers for example.

The assessments are a resource intended to support instruction, as well as provide credentials for skills mastered. Test takers have the opportunity to show mastery of skills in a topic area and when proctored, earn certificates and/or electronic badges as credentials. NDLA are designed to assess digital skills learners already know and identify areas in which additional skill building is needed. Assessments are context-based whenever possible, that is, screen displays and functions

[1] Northstar Digital Literacy includes assessments on the following 16 topics: Essential Computer Skills: Basic Computer Skills, Internet Basics, Using Email, Windows 10 OS, Windows 11 OS, Mac OS. Essential Software Skills: Microsoft Word, Microsoft Excel, Microsoft PowerPoint, Google Docs. Using Technology in Daily Life: Social Media, Information Literacy, Career Search Skills, Accessing Telehealth Appointments, Supporting K-12 Distance Learning, Your Digital Footprint.

are designed to resemble authentic digital environments that a user might experience when performing activities on a digital device.

The NDLA supports adult learners at an intermediate-level or higher English reading comprehension ability. Northstar assessments and accompanying learning resources support a diverse audience including learners accessing the resources through adult basic education sites, middle and high schools, job sites, and library systems. Northstar provides digital literacy assessments and learning resources via subscribing organizations in all 50 states and 10 countries. NDLA are used by over 3200 Adult Basic Education programs, libraries, colleges, nonprofits, workforce centers, government agencies, and businesses.

Access to the 16 online assessments is provided freely via the Northstar public website. Organizational subscriptions provide access to all Northstar curricula and other resources, as well as the capacity to award certificates and badges.

Individualized Learning Support

The Northstar Digital Literacy learning resources go beyond assessment and certification to include individualized learning and instruction. Northstar has developed learning resources in response to expressed needs of learners as use of the assessments has grown. Among these expanded learner-centered resources are a comprehensive learner management system, Northstar Online Learning (NSOL), which allows testing locations to set up individual learner accounts. This includes a direct link to online instruction practice modules linked to topic areas identified via completed assessments as needing improvement, and a list of completed assessments with scores. NSOL also includes a robust reporting mechanism for sites wanting to track engagement hours for out-of-class work completed by learners, assess digital literacy skill building for learners, and track learner progress.

In addition to the interactive online practice modules included with NSOL, Northstar has also created comprehensive in-class curricula for each topic area. The Northstar curriculum is aligned with the Minnesota Adult Basic Education Content Standards. Including the Northstar Digital Literacy Standards, College & Career Readiness Standards for Adult Education (CCRS) and the ACES Transitions Integration Framework (TIF). The Northstar curriculum supports adult learners in meeting the requirements of the Northstar assessments. Lesson plans are learner-centered and interactive. The lessons give learners multiple opportunities to build digital literacy skills through practice tasks and application of skills. Sample Alignment maps articulating skills learners build through Northstar curricula are summarized in the Appendix A. Organizations gain access to the full alignment map when subscribing to Northstar. Curricula are designed to be easily adapted to diverse learning environments.

Throughout the years of development of assessments and learning resources, Northstar has remained committed to ensuring learning resources and assessments are as accessible as possible for all users. Northstar digital literacy assessments and interactive Northstar Online Learning modules aim to support the Web Content Accessibility Guidelines 2.0 and the ICT Accessibility

508 Standards. Please view the Northstar Digital Literacy VPAT/508 Compliance report for further details.

As Northstar continues to expand, the team has translated all assessments into Spanish and continues the translation project to make all learning resources (NSOL and curricula) available in Spanish. All assessments and online learning modules are designed to be accessible for those using screen readers and include closed-captioning.

Northstar is working to further increase accessibility of resources in partnership with Northstar sites. Current projects are focused on making assessments and online learning modules fully mobile-friendly. Northstar recognizes that learners' initial capacity for digital literacy is often built on smartphones, and wants to be responsive to that reality.

Northstar Digital Literacy Standards

The NDLA maps onto the Northstar Digital Literacy Standards, which define the digital literacy skills necessary to transition to employment or post-secondary education or training. The standards assess digital literacy in three categories:

- Essential Computer Skills,
- Essential Software Skills and
- Using Technology in Daily Life.

The Northstar Digital Literacy Standards define the skills learners need in order to have basic proficiency to use email, navigate the internet, use Microsoft Word, Excel and PowerPoint, access telehealth appointments and apply basic digital literacy skills to more complex tasks, such as navigating the internet, word processing programs, and email in order to apply for a job.

The Northstar Digital Literacy Standards have been designed with input from skilled educators and subject matter experts. During the process of their development, input was also collected from various stakeholders including adult learners, teachers, volunteers, program coordinators, and librarians. Feedback has been collected through listening sessions, 1:1 interviews, online questionnaires, group feedback sessions, and consultation with experts in a topic area.

The Northstar Digital Literacy Standards have been adopted as content standards in Minnesota to define the digital literacy knowledge and skills adult students need to meet their goals and are also used across the country and worldwide. In addition to the Northstar Digital Literacy Standards, Minnesota also has adopted the College & Career Readiness Standards for Adult Education (CCRS) and the ACES Transitions Integration Framework (TIF). For programs outside of Minnesota who may not be familiar with the ACES Transitions Integration Framework (TIF), the Employability Skills Framework defines similar soft skills adult learners need to succeed in college, the workplace, and community). The assessment system is aligned to the Northstar Digital Literacy Standards, as described next.

The NDLA: What do the tests consist of and what do they measure?

The NDLA measures learners' progress in meeting the Northstar Digital Literacy Standards. The assessments are designed with a focus on individual learning and growth and provide learners an opportunity to demonstrate mastery through completion of authentic tasks. For each completed assessment, learners and teachers receive a results page that outlines standards mastered and standards learners still need to work on.

The Northstar Digital Literacy Standards defines basic skills needed to perform tasks on computers and online. Online, the self-guided interactive tests assess the ability of individuals to perform tasks based on these skills. Included are basic computer digital literacy standards and assessments in three main areas[2].

Essential Computer Skills	Essential Software Skills	Using Technology in Daily Life
● Basic Computer Skills ● Internet Basics ● Using Email ● Windows 10 OS ● Windows 11 OS ● Mac OS	● Microsoft Word ● Microsoft Excel ● Microsoft PowerPoint ● Google Docs	● Social Media ● Information Literacy ● Career Search Skills ● Accessing Telehealth Appointments ● Supporting K-12 Distance Learning ● Your Digital Footprint

As standards are developed, the Northstar team, along with subject matter experts, consider integration and placement of standards within the three main areas. For example, the Career Search Skills falls within the Using Technology in Daily Life category because this topic asks learners to use foundational digital literacy skills established through instruction and mastery of other Northstar Digital Literacy Standards to perform an effective career search. In particular, it is recommended that learners have completed the Basic Computer Skills, Internet Basics, Using Email, and Microsoft Word prior to instruction and assessment in the Career Search topic.

[2] A thorough description of Assessment Topics is provided in Chapter 2.

Chapter 2 –Assessment Topics, Administration, Scoring, and Interpretation

In this chapter, we provide more detailed descriptions of the NDLA subtests, administration, scoring, and interpretation of the test scores. The NDLA currently offers 16 assessments, each addressing a set of thematically related digital skills. Table 1 provides a list of the assessments, total items per each, and a brief description of skills addressed.

Table 1

Essential Computer Skills

provides a list of the assessments, total items per each, and a brief description of skills addressed.

Form No. & Title	No. Items	Brief description of skills addressed
Basic Computer Skills	38	Introduction to devices (tablets, desktop, laptop and smartphone) and their common features, turning on/off a device, troubleshooting basic computer challenges (no volume, restarting the computer for updates, connecting to the internet, etc.) and basic mouse skills and keyboard skills
Internet Basics	34	Connecting to the internet, finding information online, security basics when online
Using Email	32	Registering for a new email account, logging in and out, communicating via email, recognizing email phishing attempts
Windows 10	26	Navigating Windows 10 operating system tools and features, opening programs, managing windows, file storage, the Start menu
Windows 11[3]	27	Navigating Windows 11 operating system tools and features, opening programs, managing windows, file storage, the Start menu
Mac 0S	26	Navigating Mac OS tools and features, opening programs, managing windows, file storage, System Preferences, the App Store

Essential Software Skills

Microsoft Word	26	Orientation to Microsoft Word: creating, saving, and editing documents, formatting text, page layouts, inserting objects into a document, cut/copy/paste

[3] The Windows 11 assessment is not included in this analysis as it was new in Spring 2024.

Microsoft Excel	31	Identifying parts of the Excel screen, entering data, formatting cells and text, organizing a workbook, writing formulas, using Auto Fill and AutoSum to analyze data
Microsoft PowerPoint	26	Navigating Microsoft Powerpoint, formatting text, editing slides, inserting pictures and text boxes, PowerPoint presentation etiquette, transitions and animations, saving and printing
Google Docs	26	Identifying parts of the Google Docs interface, sharing and collaborating, formatting text, making lists, inserting tables and images, page setup, copy/cut/paste, finalizing a document

Using Technology in Daily Life

Career Search Skills	31	Preparing for a job search (make a plan, identify skills, research careers), networking, career search websites, creating a resume, cover letter, and portfolio, overview of the hiring process, professional communication and interviewing etiquette
Information Literacy	32	Formulating a research question, finding information with search terms, evaluating search results and websites for relevance and reliability, using note taking strategies to compare information
Social Media	17	Overview of social media platforms (Facebook, LinkedIn, Instagram, Twitter), setting up an account, managing friends/contacts, creating posts and sharing content, commenting and messaging, understanding privacy settings and scams
Your Digital Footprint	17	Introduction to digital footprints, browsing history, cookies, responsibly managing an online identity, consequences of a digital footprint
Supporting K-12 Distance Learning	23	Overview of models of remote instruction, navigating distance learning platforms, joining a virtual meeting, troubleshooting common technical issues, advocacy and supporting a child's learning and social emotional needs while distance learning.

Administration procedures

Learners can access the assessments either through the public website or through a Northstar location. While there is no formal time limit, assessments vary in time to complete from 10 – 60 minutes. Two-thirds of test takers complete assessments within 46 minutes or less. Learners taking longer than 60 minutes to complete an assessment are unlikely to pass without additional instruction in that topic area. Scores are immediately calculated and reported.

When taking an assessment at a Northstar location, proctors at the location can optionally offer proctored assessments. Learners who pass a proctored assessment are awarded a certificate. and/or a digital badge, if desired. In order to ensure a fair and equitable testing environment, proctors and test-takers are required to follow the Northstar Codes of Conduct. Assessments can be proctored in person or remotely. Northstar's Remote Learning and Testing Resources include Northstar guidelines on ensuring a secure and standardized environment. In order to establish standardization and security, test proctors are required to complete proctor training and follow codes of conduct including checking test taker IDs, observing test takers during assessment, and ending the test session for any test takers caught violating the Test Taker Code of Conduct.

Northstar Assessment Daily Limits

Learners at Northstar locations are limited to taking each assessment twice per day. Northstar recommends that sites provide instruction between testing attempts to refrain from serial testing without instruction in between the test events. This daily limit is in place to ensure the instructional needs of those assessed are met, while helping to maintain the integrity and credibility of the certificates.

Additionally, Northstar does not share assessment answer keys. Sharing an answer key to any assessment lessens the validity of assessment results over time. Instead, Northstar encourages instructors to use the standards as they plan instruction and avoid teaching to the test.

Individuals completing assessments on Northstar's public website are limited to taking each assessment once per day.

Scoring and Reporting

The assessments are scored using a weighted system based on the standards for that topic. Each assessment is based on a set of standards (usually around 15-20, some have more or fewer). Each standard is worth 1000 points. Those 1000 points are divided by the number of questions that correspond to that standard. For example, if there are two questions about a particular standard, each question is worth 500 points. Therefore, some questions are worth more points than others. If a question is answered correctly, the learner earns those points. The total points earned is divided by total possible points for a percentage. Learners need 85% or higher to pass.

Interpretation Guidelines

Once learners complete an assessment, they are shown a results page. The results page shows the percentage they earned, whether or not they passed, and which Northstar Digital Literacy Standards they have mastered and which standards need improvement. The results page *does not* show learners which questions they answered correctly or incorrectly. Results taken on Northstar's public page are not saved and cannot be accessed later.

If a learner takes an assessment at a Northstar location, these results are saved to that location's admin portal and can be viewed later by staff at the location. Staff viewing assessments results can view all the information above as well as the specific questions learners answered correctly and incorrectly. If the assessment was proctored, there will be a button to print a certificate.

If a learner takes an assessment while logged into their Northstar Online Learning (NSOL) account, they can access specific standards that were missed by clicking a link next to that standard allowing them to immediately access that section of the learning module. Additionally, learners are able to view the results page later in their NSOL accounts.

For learners interested in certifications, the following best practices are recommended.

1. Register Learners: Sign learners up for a Northstar Online Learning (NSOL) account.
2. Pre-test: Give the Northstar Assessment for the topic that will be taught as a pretest to assess knowledge of a topic's standards. Learners will take the same assessment as both a pre and post-test.
3. Teach: After reviewing learners' Results Pages, identify and plan to teach Northstar Curriculum lesson plans that target standards learners need to work on, and/or direct learners to use the corresponding NSOL module to support additional practice.
4. Post-test: Give the corresponding Northstar Digital Literacy Assessment as a post-test. Meet with learners to review their Results Page. For learners who have passed the assessment in a proctored environment, print certificates. For learners who have not passed, review the Results Page and target additional instruction to skills they still need to work on. Review pre-test scores to acknowledge growth from pretest to post-test, even when learners have not passed.
5. Unit Project: Plan to extend learning by guiding learners through the Unit Project. These standards-aligned unit projects allow learners to apply digital skills they have learned.

Conclusion

In this chapter, we reviewed the NDLA subtests, standardized administration, scoring, and interpretation of the test scores. In the next chapter, we provide details of the data used to conduct analyses.

Chapter 3: Methods and Field Test Design

In this chapter, we review the data sources and samples used for analyses…

Sample Characteristics

As noted, over 8 million administrations (proctored and unproctored) of the various Northstar Assessments have been delivered. However, client privacy and a lack of information (Northstar does not ask users for any demographic or other personal information) about users limits the use of this data for research. For this report, we extracted the data for 1000 participants who took all available proctored NDLAs, spanning several years from 2013 or earlier. As detailed in earlier chapters, proctored assessments are given and monitored by proctors who adhere to test administration training and a code of conduct in order to ensure a fair and equitable testing environment. Test-takers were spread out among 177 different Northstar locations with approximately one third of test-takers at Adult Basic Education sites (56 locations), 3 corrections sites, 26 higher education sites, 3 K-12 sites, 21 libraries and 45 non-profits, 8 workforce centers, and 15 sites defined as Other.

Chapter 4: Descriptive Statistics and Reliability

Reliability is a key metric used to evaluate the stability, consistency, and precision of any measurement instrument, such as a test. There are multiple statistics and formulas for evaluating different aspects of reliability.

For readers who may not be familiar with psychometric test reliability metrics, we provide a brief, lay description of the underlying concepts. Let's first consider the concepts of stability and consistency. Consistency is how similar a person's score is to itself across multiple tests or items of the same construct. Stability is defined as the breadth of consistency over multiple repetitions or environments. In non-technical terms, imagine weighing oneself by stepping on and off a scale. One would expect that one gets the same value for one's weight each time. Or imagine that one has two different scales. Again, one expects that the value of one's weight would be the same on each scale, that is, that they are calibrated with each other. This illustrates the concept of stability and consistency in measurement. In educational or psychological tests, such as the NDLA, this can be measured by test-retest approaches. For example, if an individual takes the same test more than once in a short period of time, we would expect their scores to be stable and consistent. This can be evaluated using correlational analyses across a group of individuals who take a test, then retake it; or by splitting the test, scoring each half, then comparing across the halves. We used the latter approach. The range is from 0 to 1 with higher values showing greater reliability.

Table 4.1 shows multiple analytic approaches to split-half reliability. Split-half reliabilities above .7 are considered acceptable, and above .8 good reliability. As Table 4.1 indicates, each NDLA test has adequate reliability across multiple split-half metrics.

Table 4.1. Split half reliability metrics across forms

Form	Max split half reliability	Guttman lambda 6	Average split half reliability	Guttman lambda 3 (alpha)	Guttman lambda 2	Minimum split half reliability (beta)
Basic computer skills	0.82	0.78	0.75	0.75	0.76	0.65
Internet basics	0.87	0.84	0.82	0.82	0.82	0.73
Using email	0.86	0.84	0.81	0.81	0.82	0.71
Windows OS	0.86	0.82	0.80	0.8	0.81	0.69
Mac OS	0.88	0.85	0.83	0.83	0.83	0.74
Microsoft Word	0.89	0.86	0.85	0.85	0.86	0.77
Microsoft Excel	0.90	0.88	0.87	0.87	0.87	0.79
Microsoft Powerpoint	0.88	0.84	0.83	0.83	0.83	0.71
Google Docs	0.85	0.81	0.78	0.78	0.79	0.64
Career search skills	0.87	0.84	0.83	0.83	0.84	0.76
Information literacy	0.87	0.85	0.84	0.84	0.84	0.78
Social media	0.74	0.68	0.66	0.66	0.67	0.49

Your digital footprint	0.78	0.73	0.73	0.73	0.73	0.58
Supporting K-12 distance learning	0.80	0.74	0.73	0.73	0.74	0.63

For the concept of precision, imagine measuring one's height with a yardstick. With such an imprecise measuring tool, all we can say is that an individual is less than or greater than three, six, or nine feet. With a 12-inch ruler, we would have precision of about one foot. For precision of measurement, we need an instrument that discriminates between score units at a fine enough grain size to meet our needs. Several statistical techniques help to evaluate the precision of a test. For example, a test with a wide range of easy to difficult questions ensures that we can discriminate between the high, low, and average scores of test takers, with values varying between .10 (difficult) and .80 (easy) considered an adequate range of item difficulties). The Item-total correlation statistic demonstrates that each question is adding some value to the precision of the score of an individual, and that the item is likely measuring the same skill as the other items in the test. (Values higher than .10-.20 are considered adequate, however, negative values are considered flawed items.) Alpha reliability is a formula that takes these item measures into account, along with the variability of the sample, to estimate precision. Alpha ranges between 0 and 1, with high values (e.g., greater than .80) considered adequate for individual testing. [For a more technical explanation of concepts and statistical models in psychological assessment and psychometrics, see for example, Cooper, 2023).]

Table 4.2 presents the number of items (No. Items), average percent correct (PCT Correct), standard deviation (SD), and coefficient alpha reliability (Alpha) estimates for each Northstar Assessment Module for the sample (n=1184). Coefficient alpha (Cronbach, 1951) was used to estimate the reliability. Alpha is a measure of whether each of the form items is correlated with the ability of the examinees who take the form. The range is from 0 to 1 with higher values showing greater reliability.

Table 4.2. Descriptive statistics and reliability properties across forms.

Form	No. Items	PCT Correct.	SD	Alpha
Basic Computer Skills	38	0.90	0.30	0.73
Internet Basics	34	0.87	0.34	0.80
Using Email	32	0.90	0.30	0.72
Windows 10	26	0.89	0.31	0.79
Mac OS	26	0.84	0.37	0.82
Microsoft Word	26	0.86	0.34	0.83
Microsoft Excel	31	0.85	0.36	0.87
Microsoft PowerPoint	26	0.85	0.36	0.81
Google Docs	26	0.88	0.33	0.75
Career Search Skills	31	0.81	0.39	0.82
Information Literacy	32	0.80	0.40	0.83

Social Media	17	0.87	0.33	0.63
Your Digital Footprint	17	0.84	0.37	0.71
Supporting K-12 Distance Learning	23	0.93	0.25	0.68

Chapter 5: Validity and Fairness

In this chapter, we review the development and operational processes that support content. construct validity, and fairness of the NDLA system. We present correlational analyses demonstrating concurrent validity. We also present descriptive statistics across locations that sample groups with different characteristics as evidence of external validity, along with a summary of an evaluation study conducted by a third party.

Northstar Assessment Development

NDLA assesses digital literacy knowledge in the form of authentic, simulated digital tasks. These standards-aligned tasks are ones that digitally literate individuals can be expected to be able to complete. The assessments also include questions written at an intermediate-level that digital literate individuals can reasonably be expected to answer correctly.

During initial development of NDLA, the assessment tool was tested for question validity through piloting beta versions in groups thought to have low digital literacy skills and groups believed to have strong digital literacy skills. Each group received the same questions. Based on these results, questions were identified that may not be valid assessments of digital literacy.

NDLA gives reliable results by asking learners to perform authentic digital tasks. The assessment asks test takers to perform actions to show their ability to meet the standards. Additionally, recognizing that there are often many ways to perform a given digital task. Northstar includes as many correct answer alternatives as possible, and provides more specific instructions where response options are limited.

In the development process, Northstar also consults with topic experts and adult basic education professionals to ensure the quality of assessment. The Northstar team also collects feedback from sites during development. As previously described, the Northstar team, along with subject matter experts, consider integration and placement of standards within the three main areas. For example, the Career Search Skills falls within the Using Technology in Daily Life category because this topic asks learners to use foundational digital literacy skills established through instruction and mastery of other Northstar Digital Literacy Standards to perform an effective career search. In particular, it is recommended that learners have completed the Basic Computer Skills, Internet Basics, Using Email, and Microsoft Word prior to instruction and assessment in the Career Search topic.

Northstar Assessment Maintenance

In order to provide tools for standardized administration and valid interpretation of results. The NDLA, standards and website were updated to Northstar Version 2.0 in 2018. This update published all assessments in HTML5 from the previous Flash version. Additionally, a codebase was developed to increase efficiency and security. An improved website, proctor experience, and detailed reporting platform was also released.

Northstar revises assessments and learning resources when necessary and as time allows. Periodically, Northstar revises and re-releases assessments based on software updates, user feedback, score analysis, and program updates, as well as evolution of social expectations in such areas as information literacy.

Northstar examines the assessments and makes revisions based on feedback received through the customer service portal, email, and analysis of scores using Google analytics. For example, when questions have a very low pass rate they are examined for language level or visual changes that may be necessary to best serve the level of learners Northstar supports. Additionally, assessments and standards may be revised based on updates to programs. For example, Northstar recently updated the Windows 10 assessment to Windows 11.

Currently, the Northstar team is working to revise several Essential Computer Skills assessments and NSOL modules for increased accessibility with screen readers and mobile compatibility.

Fairness, Equity, and Security. As previously described, in order to ensure a fair and equitable testing environment, proctors and test-takers are required to follow the Northstar Codes of Conduct. Assessments can be proctored in person or remotely. Northstar's Remote Learning and Testing Resources include Northstar guidelines on ensuring a secure and standardized environment. In order to establish standardization and security, test proctors are required to complete proctor training and follow codes of conduct including checking test taker IDs, observing test takers during assessment, and ending the test session for any test takers caught violating the Test Taker Code of Conduct.

Intercorrelations of Subtests: Because Northstar's assessment forms target different sets of digital skills, it is important to establish whether and how much construct overlap there may be between forms. Table 5.1 displays a correlation matrix of the average scores of each form. Higher correlations are highlighted in darker colors. Moderately high correlations suggest that each test is providing a degree of unique information about the digital skills of users. The table shows low to moderate correlations across subtests (.27-.63). This provides evidence that the subtests are measuring different, but overlapping digital skills, consistent with their standards-based design.

Table 5.1. Correlation matrix of assessment forms.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Basic Computer Skills														
2. Internet Basics	.56													
3. Using Email	.46	.53												
4. Windows	.41	.49	.47											
5. Mac OS	.37	.39	.46	.53										
6. Microsoft Word	.35	.41	.41	.50	.48									
7. Microsoft Excel	.35	.37	.41	.46	.53	.61								
8. Microsoft PowerPoint	.33	.38	.37	.42	.52	.56	.65							
9. Google Docs	.27	.31	.32	.40	.50	.54	.58	.61						
10. Social Media	.32	.39	.30	.35	.36	.34	.38	.41	.43					
11. Information Literacy	.36	.40	.42	.47	.47	.46	.53	.50	.50	.40				
12. Career Search Skills	.31	.37	.32	.36	.33	.39	.43	.43	.39	.03	.58			
13. Your Digital Footprint	29	.33	.28	.39	.34	.36	.44	.42	.39	.29	.48	.47		
14. Supporting K-12 Distance Learning	.32	.39	.39	.40	.38	.39	.42	.40	.42	.42	.44	.44	.37	

Evaluation Report: The NDLA has been evaluated in one formal study. Literacy Strategies (2015) conducted a quasi-experimental evaluation study of the NDLA Adult Learner Employment Outcomes. In addition to several descriptive results, the study evaluated whether the employment rate of adult learners after attending at least 4 hours of Northstar computer skills programming, in comparison to a metro wide employment comparison group. The sample of 208 adults (92.6% English-speaking; 7.4% Hmong) was spread across 28 different CTEP host site locations in the Twin Cities metro area of Minnesota.

While there was a significant increase of 14.9 percentage points in the employment rate among all adult learners surveyed, notably, among those initially unemployed and actively seeking work when they started Northstar-related basic computer skills classes, 50% had secured employment by the time of the survey, compared to 29.9% of all unemployed adult learners surveyed.

Chapter 6 - Summary and Conclusions

Northstar Digital Literacy learning resources and assessments were developed to serve adult learners to build essential digital literacy skills. Through over 3200 subscribing organizations in all 50 states and multiple countries and over 8 million digital literacy assessments taken, Northstar's impact is far-reaching and consistently growing.

Through Northstar's commitment to individualized, standards-aligned learning, the team has created a comprehensive learning system that is accessible, equitable, and responsive to the digital-literacy needs of adults. The NDLA is designed for Intermediate-level English learners who are also at a beginning digital literacy level and above.The questions in the NDLA assessments are derived from and designed to measure a learners' ability to meet the standards of each subtest topic (see Appendix B).

In this report, we conducted multiple reliability and validity analyses. As reported in Chapter 4, while there is variability across reliability estimates in the NDLA subtest versions tested, overall the NDLA estimates show adequate internal consistency and split-half reliability. Based on a ~1000 person sample drawn from administrations up to 2023, we found an average alpha internal consistency of .77 (range .63-87) and an average split-half reliability of .80 (range .66-87). These values support the intended use of the tests for providing diagnostic and instructional guidance, as well as estimates of mastery level, though further studies should be conducted to support the initial evidence found so far.

Multiple types of evidence in support of the validity of inferences drawn from the use of NDLA tests were considered. Standardized administrative procedures and daily testing limits support Northstar's commitment to creating a fair and equitable testing environment. Northstar's use of authentic digital skill tasks in the assessments, along with piloting of beta version, consultation with topic experts, assessment maintenance, and requirement of test proctor training further support claims of content and construct validity. Correlational analyses presented in Chapter 5, Table 5.1 show low to moderate correlations across subtests (.27-.63). As a result, we conclude that the subtests measure different, yet overlapping digital skills, in accordance with their standards-based design. The significant increase in employment rate among Northstar Digital Literacy learners who were surveyed in a quasi-experiment evaluation study (Literacy Strategies, 2015) speak to the external validity of the NDLA system in concert with Northstar learning resources, as does the large number of educational and workforce clients accessing and using the NDLA resources routinely.

We will be working on future editions of this report to enhance the evidence-based interpretations provided. Northstar continues to further increase accessibility, reliability, validity, and access to digital literacy support for adult learners, taking into account evolving expectations regarding digital literacy skills, user experience, and evaluative analyses. However, this First

Look at the reliability and validity of the NDLA system is consistent with the intended uses to which it was designed.

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References

Cooper, C. (2023). An Introduction to Psychometrics and Psychological Assessment (2nd edition). Routledge.

Literacy Strategies (2015). Evaluation Report: Impact of Northstar Assessment and Related Computer Skills Programming on Employment in CTEP Programs. Minnesota Literacy Council, November, 2015

Appendix A - History and Milestones in NDLA Development

History of Major Milestones in NDLA Development and Implementation
In 2008-2009, during the Great Recession, many displaced workers sought digital skills training at the Saint Paul Public Library to boost employability. To aid job seekers effectively, the library collaborated with the St. Paul Community Literacy Consortium to create an online digital literacy assessment for quickly evaluating computer skills.

In 2010, The Saint Paul Public Library collaborated to create Northstar, aiming to assess and certify digital literacy among adults with lower-skills. Through an open community process, a task force developed the Northstar Digital Literacy Standards over several months, intending to provide a valuable certificate for both employers and job seekers.

In 2011-12, once launched, Northstar became a project of Literacy Minnesota and with the help of various funders, a professional design team created, designed, piloted, and implemented the initial online assessments online.

In 2012-13, an AmeriCorps program called the Community Technology Empowerment Program (CTEP) integrated Northstar assessments system-wide, using it in 40 service delivery sites throughout the Twin Cities. This led to widespread Northstar use, and provided valuable feedback that informed early module revisions and infrastructure enhancements.

In 2014-15, a new Social Media assessment was created and five library collaborations were established using Northstar to enhance digital literacy in Greater Minnesota. The Northstar Digital Literacy Standards were adopted as statewide digital literacy standards by Minnesota Adult Basic Education, and were integrated into the new Minnesota Adult Diploma. Northstar also became an official partner with the EdTech Center at World Education. EdTech sponsored a national Northstar webinar, introducing the draft Information Literacy module, in February 2016. Northstar was also featured in a US DoE - Office of Educational Technology webinar on technology in ABE.

By 2016, the 300th Sponsor site was created and the completed Information Literacy module was released. Northstar continued to grow exponentially, with over 1,000,000 assessments administered on the public website, and several hundred thousand through testing locations.

In 2017, intensive planning was completed for Northstar V 2.0 to update standards and rebuild all assessments in HTML5 (rather than Flash). A codebase was developed for greater efficiency and security, a new website was designed and completed, and curricula resources were aligned to each standard.

In 2018, Computer Basics 2.0 was released, featuring an updated interface, new design elements, and improved navigation. Northstar surpassed 500 test sites and had administered more than 2,500,000 assessments. Late in the year, the full Version 2.0 was released, featuring an entirely new, easy-to-navigate and visually attractive website, improved proctor experience, improved reporting, with more filtering options, and many other useful features.

In 2019, Northstar Online Learning (NSOL) was released, providing individual, interactive online instruction and practice for Basic Computer Skills. Also released was a feature that allowed programs to create individual student accounts, tracking student time spent in online learning and completing assessments.

In 2020, Literacy Minnesota partnered with Ramsey County Workforce and Libraries, St Paul Public Libraries, and Tech Dump on the TechPak program funded with money from the national CARES ACT, with the intent of helping those who had experienced job loss as a result of COVID-19. The TechPak program provided laptops, wifi hotspots, and digital navigation to 500 residents of Ramsey County whose jobs were impacted by COVID-19 and who experienced digital inequities that prevented them from applying for new jobs online. Literacy Minnesota provided digital navigation to instruct recipients on how to use the new devices and Zoom, and provided proctoring (and any necessary instruction) on the Northstar Basic Computer, Internet Basics, and Email assessments with the goal of having all recipients pass all three assessments. The Digital Navigators then helped recipients set next step goals, and connected them with a provider to help meet those goals. The project ran from Aug 3rd to Dec 31st, 2020. Ecotone Analytics, an independent consultant, found that for every dollar spent for the TechPacks Initiative, there is a projected $2.40 in social value generated by increased earnings, well-being, and cost savings, which amounted to $1.8 million in projected social return for the 500 recipients.

Since 2020, in response to the pandemic, Northstar released NSOL modules for free use on the public website in the following topics; Basic Computer Skills, Using Email, Microsoft Word and Career Search Skills; developed means for remote proctoring of assessments; created a variety of curricula and online learning resources for public use; and adapted classroom curricula. New assessments for Google Docs and Supporting K-12 Distance Learning were released. Northstar test locations surpassed 1,000, then surpassed 1,235 test locations (40%+ increase over the past year). Growth continued to be rapid over the following years; new networks included a number of statewide library systems, as well as Statewide ABE programs, post-secondary institutions, and workforce center systems.

Appendix B: Sample Northstar Digital Literacy Curriculum Alignment Maps

To further support educators, programs, and learners the Northstar team embarked on a Minnesota Department of Adult Basic Education grant funded project in 2022 to outline specific College and Career Readiness Standards (CCRS) and ACES Transitions Integration Framework (TIF) supported in the Northstar curriculum. Additionally, standards integrated Unit Projects were created. These projects are designed to further support learners to apply and extend foundational digital skills. Each Northstar Digital Literacy Unit of Curricula includes a unit project. Sample CCRS Alignment Map Basic Computer Skills:

https://docs.google.com/document/d/1Wd3cDJX-qBAk2fO7AK5yW_OOF1FcTmzRNjHkVLllxW0/edit?usp=sharing

ACES/TIF Alignment Map Basic Computer Skills

https://docs.google.com/document/d/1QArleOMIx245KXk-bdLneJ3pFpjADoXgkd2Vn8rwq3U/edit?usp=sharingv

References:

https://americorps.gov/sites/default/files/evidenceexchange/FR_SaintPaulNeighborhoodNetwork_CommunityTechnologyEmpowerment_2015_1.pdf

Appendix C: Summary of "Evaluation Report: Impact of Northstar Assessment and Related Computer Skills Programming on Employment in CTEP Programs"

Overview. Literacy Strategies (2015) conducted a quasi-experimental evaluation study of the NDLA Adult Learner Employment Outcomes. Specifically, the study reported on several descriptive survey results, and compared the employment rate of adult learners after attending at least 4 hours of Northstar computer skills programming, to a metro wide employment comparison group. The study was conducted for the Community and Technology Empowerment Project (CTEP) AmeriCorps, in partnership with Literacy Minnesota (formerly The Minnesota Literacy Council).

Research Questions: The evaluation sought to determine:

- the employment rate of adult learners upon entering CTEP programs,
- the employment rate of learners after attending at least 4 hours of Northstar computer skills programming,
- the purpose of learners' attendance in basic computer skill programs and the employers and job types of adult learners who attended basic computer skills program,
- how the learners who attended the basic computer skill classes employment results compare to a metro wide employment comparison group derived from data provided by the Department of Employment and Economic Development (DEED), and
- the Return on Investment for the value of all new jobs received by computer class participants.

Methods: The study utilized a quasi-experimental design. A 23-question interview-survey was designed to address the research questions. Interviews were conducted by trained AmeriCorps CTEP members among adult learners participating in Northstar Digital Literacy computer skills classes across 28 different CTEP host site locations in the Twin Cities metro area of Minnesota. To establish a comparison group, DEED was contacted to gather employment data for individuals served by WorkForce Centers in the same metropolitan counties as CTEP sites during the timeframe when learners accessed Northstar Digital Literacy training, and for comparable hours. The analysis focused on individuals who were unemployed when they first received services. Subsequently, the employment status of this group was assessed 90 days after their last service date to determine the final employment outcome statistic.

Sample: Adult learners were screened for eligibility in the study based on the following criteria; at least four hours of attendance of Northstar-related computer instruction, passed at least one Northstar Assessment, passed their first Northstar Assessment at least four weeks prior to administration of survey (only assessments used as post-tests qualify), attendance of Northstar-related computer instruction after May 26, 2014, and must be an adult learner (older than the age of 16 at the start of class).

A total of 208 surveys were administered using a questionnaire comprising 23 questions, available in both English and translated into Hmong. To protect participant anonymity, the 208 surveyed individuals were not required to disclose their race, ethnicity, or primary language spoken. However, the questionnaire did collect information on age and the language used during the interview to gather essential demographic data while maintaining anonymity. Among respondents, 92.6% were interviewed in English and 7.4% in Hmong. The survey results showed that a significant portion of respondents fell within the age range of 25-54 years, comprising 59.9% of the total. The next largest groups were aged 55-64 years, accounting for 18.8%, and 16-19 years, totaling 10.6%. These age categories were selected in accordance with standard classifications used by the Bureau of Labor Statistics.

Results

***Descriptive*:** On average, survey respondents completed 22.9 hours of Northstar related programming. The average number of days between the date of first attendance in Northstar programming and passing their first Northstar Assessment was 32.18 days. Over half of all survey respondents passed a Northstar assessment in less than nine days of first attending class, and on average, survey respondents passed their first assessment in just over one month.

The most common assessment passed by survey respondents was Basic Computer Skills (63.2%), followed by World Wide Web (Internet Basics) (43.1%), MS Word (35.8%) and Using Email (30.4%). On average, survey respondents passed 2.28 assessments each. The majority (65.7%) of all survey respondents did receive certification for passing a Northstar Assessment in the form of a printed certificate.

The top three reasons for attending Northstar-related programming were reported as personal improvement (42.9%), help with job search (41.9%) and to improve skills in MS Word (37.4%)

***Impact/Outcomes*:** This study revealed a significant increase of 14.9 percentage points in the employment rate among surveyed adult learners. Notably, among those initially unemployed and actively seeking work when they started Northstar-related basic computer skills classes, 50% had secured employment by the time of the survey, compared to 29.9% of all unemployed adult learners surveyed. Additionally, the study included a comparison with an employment sector group from six Twin Cities metro-wide workforce centers during the same period. Of those who received at least 4 hours of assistance which did not include the use of Northstar assessments or standard related instruction at these centers between July 1, 2014, and March 31, 2015, approximately 41% (339 out of 818) found employment 90 days after their last service date. In contrast, participants in the CTEP program receiving Northstar-related basic computer skill training experienced a 50% employment rate change during the same period.

Literacy Strategies (2015). Evaluation Report: Impact of Northstar Assessment and Related Computer Skills Programming on Employment in CTEP Programs. Minnesota Literacy Council, November, 2015