Electronic Document Dictation Project
A measure of costs and benefits of SpeakWrite and Dragon Naturally Speaking

August 2007

Submitted by Public Knowledge, LLC

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# Table of Contents

**I. INTRODUCTION**

A. BACKGROUND ................................................................. 4  
B. DESCRIPTION OF PRODUCTS .............................................. 4  

**II. DHS GOALS FOR ELECTRONIC DOCUMENT DICTATION**

A. TIME BASED GOALS ............................................................... 5  
   1. Spend less time writing case notes, narratives, and assessments ......................................................... 5  
   2. Shorten time between client interaction and writing case notes or narratives ............................................. 6  
B. IMPROVED QUALITY OF CASE NOTES, NARRATIVES AND ASSESSMENTS ................................................. 6  
C. COST EFFECTIVENESS ............................................................ 6  

**III. REPORT OBJECTIVES** .......................................................... 7  

**IV. METHODOLOGY** ................................................................. 7  

**V. FINDINGS** ................................................................. 10  

A. WORKERS’ REPORT A MODERATE LIKELIHOOD OF USING AN ELECTRONIC DOCUMENT DICTATION PRODUCT ........... 10  
   1. SpeakWrite Use Low Among Caseworkers ................................................................. 10  
   2. High Opportunity for SpeakWrite Use While Out Of Office ..................................................... 11  
   3. SpeakWrite Popular with those Who Use It ................................................................. 12  
B. SPEAKWRITE USERS SEE BENEFITS, BUT USERS OF BOTH PRODUCTS EXPRESS CONCERNS ................................................................. 12  
   1. SpeakWrite Users Report Saving Time ................................................................. 12  
   2. SpeakWrite Users Report Improved Quality of Case Notes and Other Benefits When Using SpeakWrite ..................................................... 13  
   3. Anecdotal Information on Worker Satisfaction with Both Products ..................................................... 14  
C. COMPARISON OF SPEAKWRITE AND DRAGON NATURALLY SPEAKING ................................................................. 15  
   1. TIME BASED GOALS ................................................................................................................. 15  
   2. SpeakWrite Users Show Highest Quality of Case Notes, Narratives and Assessments ..................................................... 21  
   3. SpeakWrite Costs More than Dragon Naturally Speaking, but has Greater Potential for Savings ..................................................... 23  

**VI. CONCLUSIONS** ................................................................. 27  

A. SPEAKWRITE PERFORMED AT LEAST MODERATELY WELL ON THE THREE TIME AND QUALITY GOALS PUT FORTH BY DHS .... 27  
B. SPEAKWRITE IS MORE EXPENSIVE THAN DRAGON NATURALLY SPEAKING BUT ITS ANNUAL SAVINGS ARE POTENTIALLY GREATER ............................................................................................................... 28  
C. DRAGON NATURALLY SPEAKING RESULTS INCONCLUSIVE ......................................................................................................... 28  
D. OPTIMUM LEVEL OF USE YET TO BE DETERMINED ................................................................................................................. 29  

Oregon DHS Electronic Dictation Devices Study August 2007
E. OTHER ACCOMODATIONS SHOULD BE CONSIDERED

VII. RECOMMENDATIONS

A. UTILIZE SPEAKWRITE FOR ELECTRONIC DICTATION
B. CONSIDER THE NEEDS AND COSTS OF ACCOMODATIONS ASSOCIATED WITH BROAD USE OF SPEAKWRITE
C. MONITOR SPEAKWRITE BENEFITS TO DETERMINE OPTIMUM NUMBER OF USERS
D. CONTINUE TO MONITOR THE QUALITY OF DRAGON NATURALLY SPEAKING

Tables and Charts

Table 1: SpeakWrite Survey General Results
Table 2: SpeakWrite Survey Out of Office Responses
Table 3: SpeakWrite Survey Satisfaction Responses
Table 4: SpeakWrite Survey Time Responses
Table 5: SpeakWrite Survey Documentation and Performance Results
Table 6: SpeakWrite Usage
Table 7: DNS Costs
Table 8: Cost comparison

Chart 1: Oregon City Users Time Reported Saved Each Week
Chart 2: Oregon City Percent of CPS Initial Case Notes on Contacts Entered within 14 days, for Referrals Received, by Week and Group
Chart 3: Oregon City Percent of 30 day Face-to-Face Contact Entered (Point in Time), by Group
Chart 4: Oregon City Quality Review Results
I. INTRODUCTION

A. BACKGROUND

Electronic document dictation products allow for the transfer of information into a computer through talking instead of typing. Such technology could be useful in a variety of situations where regular, lengthy typing is required. Oregon Department of Human Services (DHS) officials believe electronic document dictation could be beneficial for their staff who must record extensive case notes. DHS caseworkers and protective services workers in the Child Welfare and Self-Sufficiency programs must record every interaction they have with a client—a process that can require a substantial amount of time. DHS officials believe typing can be inefficient and can take time away from providing direct services to clients. Based on this belief, DHS began experimenting with electronic document dictation products.

Two years ago DHS piloted an electronic document dictation product called CyberSecretaries, now known as SpeakWrite. DHS was unable to sustain funding for the pilot project and discontinued the service. In November 2006, the Legislative Emergency Board allocated funding to reinstate the service and asked DHS to evaluate efficiencies generated by the use of the service and report back to the legislature. The Department of Human Services was also asked to determine if those efficiencies would generate enough savings to fund the service in the future. While conducting this study for the legislature, officials at DHS decided to simultaneously test another related electronic document dictation product called Dragon Naturally Speaking.

B. DESCRIPTION OF PRODUCTS

This study focuses on two electronic document dictation products in use at DHS:

- Users of SpeakWrite place a phone call to the SpeakWrite system and leave a dictated recording the same way a message left on voicemail is recorded. A transcriber working for SpeakWrite then listens to the recorded dictation, types it, and emails it to the person who recorded it. Dictations can be typed into a paragraph format, or into templates that DHS has created with SpeakWrite. Users wanting their notes to be typed into a template need only to reference which template number they would like used when they begin
their dictation. Transcribers are available 24 hours a day and SpeakWrite commits to a maximum two-hour turnaround time from when a message is left until the email is sent back to the user.

- Users of **Dragon Naturally Speaking** dictate into a headset at their computers. The Dragon Naturally Speaking software then converts the spoken words into text on the computer. In order for the software to understand the user, the user “trains” it by reading prepared text. The more time a user spends training and correcting the software, the higher the quality (i.e. fewer errors) of the transcription. Dragon Naturally Speaking may also be used in conjunction with a digital voice recorder. A digital voice recorder operates similar to a small tape recorder, allowing the user to record their voice. This device can then be plugged into the computer at a later time and the recording will be transcribed by the Dragon Naturally Speaking software.

II. DHS GOALS FOR ELECTRONIC DOCUMENT DICTATION

Caseworkers spend considerable time recording their interactions with clients. This information is put into electronic databases and paper case records. It is important that these case notes, narratives and assessments be entered timely and accurately as they are frequently relied upon by decision makers regarding the care and future of DHS's clients. Case records, for example, are often used as evidence in court proceedings. Caseworkers stand to benefit considerably from any technology that would assist them in spending less time writing up case notes, shortening the time between the client interaction and when the case notes are written, and improving the quality of case notes they write. Any perceived benefits or improvements, however, must be measured against costs outlaid in obtaining electronic document dictation products.

A. TIME BASED GOALS

1. Spend less time writing case notes, narratives, and assessments

   One goal DHS has for implementing electronic document dictation is that caseworkers will spend less time writing case notes and entering them into various databases. Many caseworkers believe that they can dictate faster than they can type. In addition, caseworkers described to Public Knowledge that when they type their notes into the system, they spend a lot of time self-editing as they go. When they dictate, they spend less time editing after the fact.
Many caseworkers also spend a considerable amount of time outside of the office. It is not uncommon for them to find themselves waiting at a client’s house or waiting off-site in between client appointments. With the use of an electronic document dictation product, this time can be spent dictating notes. If using SpeakWrite, for example, a worker could call in from a cell phone and begin recording notes. Similarly, a Dragon Naturally Speaking user could dictate notes while away from the office if the worker employed the use of a digital voice recorder.

2. Shorten time between client interaction and writing case notes or narratives

Another goal DHS is trying to achieve is shortening the time between the client interaction and when caseworkers enter their assessments of that interaction into the appropriate database. Case notes entered timelier make the databases more accurate and complete and improve the usefulness of the databases. The database used by caseworkers to enter case notes, narratives and assessments is the FACIS (Family and Children Information System) system. This system is described in more detail below.

B. IMPROVED QUALITY OF CASE NOTES, NARRATIVES AND ASSESSMENTS

A third goal of DHS is to improve the quality of notes and assessments that entered into their systems. Quality measures that DHS would like to improve include the level of detail and thoroughness contained in the notes. In addition, DHS would like to see an improvement around the technical quality of the notes such as grammar, spelling, and sentence structure.

C. COST EFFECTIVENESS

The selected product should be cost effective. An assessment of the time saved and the value of this time to DHS versus the cost of the documentation product will help DHS officials and the legislature assess the

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1 Caseworkers are not issued cell phones through DHS and would need to use their own personal cell phone to make such calls. Workers are not reimbursed or compensated for cell phone minutes used for calling to dictate notes. Caseworkers are also instructed they may not make calls while they are driving—only when parked or waiting.
overall cost effectiveness of the dictation product. In addition, cost comparisons can be made between the two products examined in this study.

III. REPORT OBJECTIVES

The specific objectives of this study are:

- To evaluate whether SpeakWrite could help DHS to meet its goals, and
- To determine if an alternative product, Dragon Naturally Speaking, could better help DHS to meet its goals.

IV. METHODOLOGY

The Oregon Legislature requested that DHS conduct a study to evaluate the benefits and costs of using SpeakWrite, and as such, the main focus of our study and this report is SpeakWrite. Public Knowledge also included Dragon Naturally Speaking in this study because it is an alternative electronic dictation product that DHS could also adopt if it proved more efficient or cost effective than SpeakWrite. However, we studied Dragon Naturally Speaking on a much smaller scale. The two products are compared where possible and reasonable.

Public Knowledge used DHS’s goals for an electronic document dictation product as criteria for evaluating SpeakWrite and Dragon Naturally Speaking. To determine whether SpeakWrite or Dragon Naturally Speaking could help DHS to achieve its goals, Public Knowledge used several approaches based on two data sources:

- **Oregon City user group**—A controlled study was conducted with 42 caseworkers at the Oregon City DHS branch office. The 42 caseworkers were divided into three groups of 14—SpeakWrite users, Dragon Naturally Speaking users, and a control group. The SpeakWrite users were trained on the system and given access to it in February of 2007. Dragon Naturally Speaking users were also given access to the software in February, but due to a complication with headphones, were not actually able to use the system until the week of April 23, 2007. Both groups were encouraged by supervisors to use the technologies. The control group used neither system and continued to write up their case notes, narratives and assessments as they had previously.

- **Statewide SpeakWrite user survey**—Public Knowledge worked with DHS to write and distribute a survey to 2,186 DHS caseworkers who were given the opportunity to use SpeakWrite. They were not necessarily
encouraged by their supervisors to use SpeakWrite. In February of 2007, these 2,186 DHS employees were enrolled with SpeakWrite and given an access code to use the system. The survey was distributed in June 2007, and had a response rate of 47 percent.

- **SpeakWrite usage data**—The SpeakWrite company provided Public Knowledge with a variety of data on DHS’s workers’ use of SpeakWrite. This data includes data on both the Oregon City users and the statewide users. From their database they were able to compile the total number of jobs called in per worker, the total number of words transcribed per worker, the total cost per worker, the average words per job and the average cost per job. Public Knowledge used this data to estimate future costs of SpeakWrite for DHS.

- **Interviews and survey comments**—Public Knowledge collected anecdotal information on worker’s impressions of the products and their likelihood to use the products through in-person and telephone interviews as well as through comment boxes on the surveys distributed. Public Knowledge conducted 13 interviews and received comments from approximately 600 people between surveys of the Oregon City users and statewide users.

Before measuring whether either or both of the products could help DHS to reach its goals, Public Knowledge needed to assess the likelihood that users would use the products. We measured this likelihood through various questions on the statewide SpeakWrite survey. Although similar questions regarding likelihood to use the product were asked of Oregon City Dragon Naturally Speaking users, those users were highly encouraged by their manager to use the product frequently. As a result, their responses regarding frequency and length of use are likely to reflect that bias. Therefore, when quantifying the likelihood to use a product, Public Knowledge based our results on workers response to the statewide SpeakWrite survey. Public Knowledge collected anecdotal information on worker’s impressions of the products and their likelihood to use the products through in-person and telephone interviews as well as through comment boxes on the surveys distributed.

Once a likelihood to use an electronic document dictation product was established, the data were used in the following ways to measure the products’ ability to help DHS meet its goals.
Spend less time writing case notes, narratives and assessments—
Statewide SpeakWrite users were asked on the survey to estimate whether SpeakWrite saved them time, and if so, how much time each week. A similar survey was distributed to the Oregon City user group from which data was gathered regarding both Dragon Naturally Speaking and SpeakWrite user estimates of time saved during the study period. Eleven of 14 Dragon Naturally Speaking users responded to the Oregon City Survey and seven of 14 SpeakWrite users.

Shorten the time between client interaction and writing case notes or narratives—
DHS extracted data from a DHS’s child welfare case management system, FACIS, to assess the percentage of completed face-to-face visits by workers and the entry of assessment information following a report of abuse. DHS pulled data from FACIS and provided it to Public Knowledge for analysis. Caseworkers are responsible for face-to-face contact with clients every 30 days and are required to enter information regarding these visits into the FACIS database. The database was analyzed to determine what percent of face-to-face visits were completed and what percentage of initial assessments were entered into FACIS within 14 days. Face-to-face contacts were tracked for a two month period of time during the study period and data was provided for the weeks starting with January 6, 2007 through May 12, 2007.

Improved quality of case notes, narratives, and assessments—
To measure and compare differences in the quality of case notes, narratives, and assessments, Oregon City study group users’ case notes, narratives and assessments were compared in a peer review. A team of two Child Welfare policy analysts evaluated the quality of the case notes, narratives and assessments written by SpeakWrite users, Dragon Naturally Speaking users, and the control group, using a data collection instrument developed by a team of DHS employees and Public Knowledge. The reviewers were unaware as to which, if any, product was used to write the case notes, narratives and assessments they were reviewing. Two-hundred and nine case notes, narratives, or assessments were reviewed.

Cost effectiveness—
Statewide SpeakWrite survey respondents’ estimates of time saved were paired with general salary information based on self reporting of employment titles to calculate the monetary value to DHS of estimated time saved using SpeakWrite. Oregon City user group survey data on the estimated hours saved by Dragon Naturally Speaking users were paired with general salary information based on self reporting of employment titles to calculate the monetary value to DHS of estimated time saved using Dragon Naturally Speaking.
Speaking users was used to estimate the cost effectiveness of Dragon Naturally Speaking. Because the Dragon Naturally Speaking user group was so much smaller that the statewide SpeakWrite user group, the responses of the 11 Dragon Naturally Speaking users were extrapolated to the size of the SpeakWrite user group to compare costs.

V. FINDINGS

A. WORKERS’ REPORT A MODERATE LIKELIHOOD OF USING AN ELECTRONIC DOCUMENT DICTATION PRODUCT

Workers’ likelihood to use an electronic document dictation product was based on the statewide SpeakWrite user survey. Anecdotal information was collected from interviews with workers and comments made on surveys. Although we found current SpeakWrite use rates to be low, we found that the potential to use it to be high, and that the product is popular among those who do use it. We were also able to gain some information as to why some workers are frustrated with both SpeakWrite and Dragon Naturally Speaking.

1. SpeakWrite Use Low Among Caseworkers

Data Source: Statewide SpeakWrite Survey—Although DHS has offered access to the SpeakWrite product to many of its employees, a low percentage has chosen to use it. DHS conducted a survey of 2,186 DHS employees that were initially enrolled to use SpeakWrite in February of 2007. One thousand and twenty three employees responded to the survey, for a response rate of 47 percent. Respondents included, in descending order, caseworkers, protective services workers, case managers, eligibility workers, certifiers, managers, and social service assistants. Four hundred and ten Self-Sufficiency workers and 558 Child Protective Services workers responded. Of the 1,023 respondents, only 392 indicated they had used SpeakWrite. Of those that have used SpeakWrite, a majority of them—66 percent—have been using it since first offered access in February. Forty-two percent of users reported using SpeakWrite weekly, while 22 percent used it monthly, and 17 percent used it daily.

2 Data was not available to identify the department for the remaining 55 respondents.
Table 1: Statewide SpeakWrite Survey General Results

<table>
<thead>
<tr>
<th>Question</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you work for</td>
<td></td>
</tr>
<tr>
<td>Self-Sufficiency</td>
<td>410</td>
</tr>
<tr>
<td>Child Protective Services</td>
<td>558</td>
</tr>
<tr>
<td>Other/NA</td>
<td>55</td>
</tr>
<tr>
<td>Have you used SpeakWrite?</td>
<td>Yes—392</td>
</tr>
<tr>
<td>38 percent</td>
<td></td>
</tr>
<tr>
<td>Used SpeakWrite since February?</td>
<td>Yes—259</td>
</tr>
<tr>
<td>66 percent (of the 392)</td>
<td></td>
</tr>
<tr>
<td>How frequently do you use SpeakWrite?</td>
<td>Daily—17 percent (of the 392)</td>
</tr>
<tr>
<td></td>
<td>Weekly—42 percent</td>
</tr>
<tr>
<td></td>
<td>Monthly—22 percent</td>
</tr>
</tbody>
</table>

2. High Opportunity for SpeakWrite Use While Out Of Office

Data Source: Statewide SpeakWrite Survey—A major advantage DHS sees to offering their employees the use of the SpeakWrite product is to help workers make better use of their time spent outside the office. Forty-six percent of Self-Sufficiency workers and 95 percent of Child Protective Services workers indicated that they conducted field visits, home visits, investigations or other meetings with clients that take them out of the office. Of those that work outside of the office, 81 percent indicate they are out of the office several times a week.

Table 2: SpeakWrite Survey Out of Office Responses

<table>
<thead>
<tr>
<th>Question</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you conduct meetings with clients that take place out of the office?</td>
<td></td>
</tr>
<tr>
<td>Self-Sufficiency</td>
<td>Yes—46 percent</td>
</tr>
<tr>
<td>Child Protective Services</td>
<td>Yes—95 percent</td>
</tr>
<tr>
<td>Out of the office several times a week?</td>
<td>Yes—80 percent</td>
</tr>
</tbody>
</table>
3. SpeakWrite Popular with those Who Use It

**Data Source: Statewide SpeakWrite Survey**—Eighty-six percent of respondents who use SpeakWrite indicated that they would continue to use it if given the opportunity. Over ninety percent of respondents said they were either very satisfied or somewhat satisfied with SpeakWrite.

<table>
<thead>
<tr>
<th>Question</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Would you continue to use SpeakWrite if given the opportunity?</td>
<td>Yes—86 percent</td>
</tr>
<tr>
<td>How satisfied are you with SpeakWrite?</td>
<td>Very Satisfied or Somewhat Satisfied—90.8 percent</td>
</tr>
</tbody>
</table>

B. SpeakWrite Users See Benefits, but Users of Both Products Express Concerns

1. SpeakWrite Users Report Saving Time

**Data Source: Statewide SpeakWrite Survey**—Over 84 percent of respondents to the statewide SpeakWrite survey that use SpeakWrite indicated that using the product saved them time. Over ninety percent of respondents who identified themselves as certifiers, managers, or protective services workers agreed or strongly agreed that using SpeakWrite saves them time. Whereas over 51 percent of respondents estimated that they spent more than nine hours per week writing up case notes or narratives before using SpeakWrite, less than 20 percent spent that much time while using SpeakWrite. The percent that spent more than 12 hours per week writing up case notes and narratives dropped from 28 percent to less than nine percent.
Table 4: SpeakWrite Survey Time Responses

<table>
<thead>
<tr>
<th>Question</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using SpeakWrite saves me time.</td>
<td>Strongly agree or agree—84.4 percent</td>
</tr>
<tr>
<td>Certifiers</td>
<td>Strongly agree or agree—95 percent</td>
</tr>
<tr>
<td>Managers</td>
<td>Strongly agree or agree—92 percent</td>
</tr>
<tr>
<td>Protective service workers</td>
<td>Strongly agree or agree—92 percent</td>
</tr>
<tr>
<td>Spend more than 9 hours writing up case notes or narratives before using</td>
<td>51 percent</td>
</tr>
<tr>
<td>SpeakWrite.</td>
<td></td>
</tr>
<tr>
<td>Spend more than 9 hours writing up case notes or narratives after using</td>
<td>19.7 percent</td>
</tr>
<tr>
<td>SpeakWrite.</td>
<td></td>
</tr>
<tr>
<td>Spend more than 12 hours writing up case notes or narratives before using</td>
<td>28 percent</td>
</tr>
<tr>
<td>SpeakWrite.</td>
<td></td>
</tr>
<tr>
<td>Spend more than 12 hours writing up case notes or narratives after using</td>
<td>8.8 percent</td>
</tr>
<tr>
<td>SpeakWrite.</td>
<td></td>
</tr>
</tbody>
</table>

2. SpeakWrite Users Report Improved Quality of Case Notes and Other Benefits When Using SpeakWrite

Data Source: Statewide SpeakWrite Survey—When asked whether SpeakWrite improves the quality of their case notes, narratives, and assessments, 60 percent of respondents to the statewide SpeakWrite survey either agreed or strongly agreed that it did. Seventy-four percent of caseworkers agreed or strongly agreed that SpeakWrite allowed them to be more productive while they were out of the office, and 84 percent agreed or strongly agreed that it gave them flexibility in time and place to do their work.
### Table 5: SpeakWrite Survey Documentation and Performance Results

<table>
<thead>
<tr>
<th>Question</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using SpeakWrite improves the quality of my case notes and narratives.</td>
<td>Strongly agree or agree—60 percent</td>
</tr>
<tr>
<td>Using SpeakWrite allows me to be more productive when I'm out of the office.</td>
<td>Strongly agree or agree—64 percent</td>
</tr>
<tr>
<td>Using SpeakWrite allows me flexibility in time and place to do my work.</td>
<td>Strongly agree or agree—84 percent</td>
</tr>
</tbody>
</table>

3. **Anecdotal Information on Worker Satisfaction with Both Products**

**Data Source: Statewide SpeakWrite Survey, Oregon City User Group**—Public Knowledge collected anecdotal information on worker’s impressions of the products through in person and telephone interviews as well as through comment boxes on the surveys distributed. In regard to both products, there were workers that expressed frustrations. Some caseworkers felt that they spent more time editing their notes when they had been electronically dictated and that SpeakWrite didn’t save them time. SpeakWrite users also noted that sometimes they couldn’t tell if they had been cut off and their dictation had stopped recording. They also wanted more templates to be available through SpeakWrite. Templates provide formatting to case notes appropriate for entering in to different systems. SpeakWrite users also commented on the variation in typists. Some typists understood a lot more than others, or were more competent with basic grammar and punctuation, and as a result, provided a higher quality transcription. Workers also noted they wished transcribers were more familiar with DHS acronyms and terminology. Some workers commented that if they didn’t have a personal cell phone they lost the ability to access the SpeakWrite system while out on site visits.

Dragon Naturally Speaking users were most frustrated with the headsets, and that the software frequently did not understand them. Those not satisfied with the software commented that it took too long to teach it to recognize the way they speak. Others felt that the software wasn’t given a fair chance due to the technical problems initially encountered.
A concern for workers using either product was the ability of co-workers or clients in the office to hear them while they were dictating at their desks. The information that workers dictate is confidential, and therefore should not be overheard either by co-workers or clients that may be sitting at the desk of a co-worker. An Oregon City worker commented that the noise level in the office had increased as everyone was talking more to dictate their notes.

C. COMPARISON OF SPEAKWRITE AND DRAGON NATURALLY SPEAKING

SpeakWrite users reported saving more time using an electronic document dictation product than did Dragon Naturally Speaking users. The products’ success in allowing workers to enter case notes or narratives into DHS databases more timely after contact with clients was mixed. As measured through a peer review, case notes, narratives, and assessments written by users of SpeakWrite scored highest in a quality review. Lastly, although Dragon Naturally Speaking is less expensive, based on estimates of time saved by the two products, SpeakWrite has the potential to save DHS more money.

1. TIME BASED GOALS

a. SpeakWrite users report saving more time than Dragon Naturally Speaking users writing case notes, narratives, and assessments

Data Source: Oregon City User Group—A group of Oregon City caseworkers were also asked to report on the time they estimated that the electronic document dictation product to which they were assigned saved them. As illustrated in Chart 1, SpeakWrite users more frequently reported the product saved them time and less frequently reported it did not save them time as compared to the Dragon Naturally Speaking users.

- Seven of the 14 SpeakWrite users responded to the survey, as did 11 Dragon Naturally Speaking users and seven members of the control group.
- Three of the seven responding SpeakWrite users (43 percent) reported that SpeakWrite saves them between one and four hours per week.
One of the seven SpeakWrite respondents (14 percent) reported it saved them less than one hour and one person (14 percent) reported that it saved them more than 12 hours.

Two of seven SpeakWrite respondents (29 percent) reported that SpeakWrite did not save them time.

Seven of the 11 Dragon Naturally Speaking (64 percent) respondents reported that the product did not save them time.

Two Dragon Naturally Speaking respondents (18 percent) reported it saved them between one and four hours and two others (18 percent) reported it saved them 5-6 hours.

**Chart 1: Oregon City Users Time Reported Saved Each Week**
b. Products show mixed results in shortening the time between client interaction and writing assessments; FACIS data

i. FACIS Data—Cases Entered Within 14 Days
   Data Source: Oregon City User Group—Measures of time saved reported through survey data is a subjective estimate made by survey respondents. An objective measure of whether time is saved is to determine whether case notes, narratives, and assessments are being entered more timely into a Child Protective Services (CPS) database called FACIS. When CPS receives a call expressing concern for the safety of a child, they send a CPS assessor out to make an initial contact with the child and parents. CPS assessors are required to input the date of first contact with the parent(s) and child, as well as the first attempted child contact, if applicable, into the FACIS database.

Caseworkers must enter assessments of their initial contacts with clients into the CPS database. The period used by DHS to assess whether assessments have been entered into the system is within 14 days of the contact. DHS provided us with data to analyze what percent of Oregon City workers had entered their assessments within 14 days by the three user groups—the SpeakWrite users, the Dragon Naturally Speaking users, and the control group, which did not use either product (see Chart 2). The data was from the time period January 6, 2007 through May 12, 2007. The total number of cases referred through CPS for the 42 users in that time period was 439, or on average, 10.5 per caseworker. Because of the small numbers of cases in some weeks, there is considerable variation in the data for all three groups. In order to smooth out some of the variation, Public Knowledge used monthly averages to display the data in Chart 2. The range of number of cases per week per user group varied from as few as three to a high of 16.

In examining trend data, Dragon Naturally Speaking users showed the greatest consistency in entering their assessments within 14 days.
Chart 2: Oregon City Percent of CPS Assessments Entered within 14 days, for Referrals Received, by Week and Group

Data Source: Oregon City User Group—After initial contact, caseworkers are responsible for 30-day face-to-face contacts. The contact has two purposes. First and
foremost, the caseworker is managing the child’s safety and frequent contact is a part of the caseworker's role in managing child safety. The caseworker is also responsible for monitoring the changes in the family, continually assessing protective capacity, always ensuring that Child Welfare interventions are the least intrusive means of keeping the child safe, and making adjustments to Child Welfare's interventions whenever indicated. These face-to-face contacts must be entered into the FACIS database. Caseworkers are instructed to enter their assessments of those contacts “quickly.” DHS provided Public Knowledge with data to analyze what percent of case notes on contacts were entered into the system on a daily basis between April 1, 2007 and May 27, 2007.

While overall the data did not show that the percent of assessments entered into the FACIS system increased over the two month period (see Chart 3), it did show that SpeakWrite users consistently had a higher percent of their contacts entered into the system. The Dragon Naturally Speaking users generally performed lower than SpeakWrite users and the control group. The overall downward trend, DHS officials explained, could have been due to other policy changes made during this time period, such as a moratorium on overtime.
Chart 3: Oregon City Percent of 30 day Face-to-Face Assessments Entered (Point in Time), by Group
2. SpeakWrite Users Show Highest Quality of Case Notes, Narratives and Assessments

Data Source: Oregon City User Group—The quality of case notes is important as they are frequently relied upon by decision makers outside of the DHS system regarding the care and future of DHS’s clients. For example, case notes, narratives, and assessments can be used as evidence in court proceedings. A team of two Child Welfare policy analysts conducted a peer review to evaluate the quality of the case notes, narratives and assessments using a data collection instrument designed by a team of Public Knowledge and DHS employees. The instrument was designed to measure three aspects of the case notes, narratives and assessments:

1. Observations made by the worker such as the condition of the child during the home visit,
2. The ongoing safety plan and whether it continues to assure the safety of the child as well as revisions to the safety plan, and
3. The technical quality of the case notes including grammar, spelling, and sentence structure of the case note or narrative.

The first two measures were evaluated on a scale of one through three according to whether minimal (1), adequate (2), or more than adequate (3) information was provided. The technical quality of the case note or narrative was also evaluated on a scale of one through three according to whether the technical quality was less than adequate (1), adequate (2), or more than adequate (3). On both scales, three is the best rating and one is the lowest.

As reflected in Chart 4, the case notes, narratives and assessments written by SpeakWrite users reflected the highest quality. SpeakWrite users’ case notes, narratives, and assessments rated best in two of the three categories. None of the case notes, narratives, or assessments earned the best rating for the third measure regarding the safety plan. The case notes, narratives and assessments written by Dragon Naturally Speaking users had the second-highest percent of the best rating (3—more than adequate information was provided). The control group had the lowest percent of the best rating. Case notes, narratives and assessments written by those using SpeakWrite had the lowest percent of their notes rated with a one—minimal information was provided, and the control group had the highest percent of ones, with Dragon Naturally Speaking in the middle. Two-hundred and nine
case notes, narratives or assessments were reviewed. Sixty were SpeakWrite users, 77 Dragon Naturally Speaking users, and 72 from the control group.

Chart 4: Oregon City Quality Review Results
3. **SpeakWrite Costs More than Dragon Naturally Speaking, but has Greater Potential for Savings**

a. **SpeakWrite Costs**

Data Source: **SpeakWrite Data**—Use of the SpeakWrite product is charged on a per word basis. DHS is billed at a rate of $.0125 for every word transcribed. The $.0125 per word is SpeakWrite’s general rate—they charge $.015 for legal documents and $.02 for group conversations. Training and customer support are fully included. There is no start-up or initiation fee charged by SpeakWrite.

SpeakWrite provided data to Public Knowledge on 2,236 DHS employees and their use of the SpeakWrite product between February 26, 2007 and May 13, 2007. These 2,236 employees were all enrolled and eligible to use SpeakWrite beginning in February of 2007.\(^3\) Eight-hundred fifty-four of the users were Self-Sufficiency workers and 1,367 of them were Child Welfare workers.\(^4\) The data show that 422 of the 2,236 DHS employees used the SpeakWrite product at least once in the 11 week study. Forty-nine of the 422 users used the system just once. The average number of uses for the total group of 2,236 employees was 3.4. For the group that actually used the product, the average number of uses was 18. The average number of words per use for users was 718. For the total 11 week period, the cost to DHS was $68,994 for these employees. On average, the 2,236 employees included in this data set cost DHS $31 per person and $9 per case note or narrative entered into the system. The cost per employee who actually used the system will average approximately $773 per person per year.

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\(^3\) Employees who were enrolled to use SpeakWrite but who left DHS before the end of the study period were removed from the data set.

\(^4\) Data was not available on the type of worker for the other 15 workers in the data set.
Table 6: SpeakWrite Usage

<table>
<thead>
<tr>
<th>Time period</th>
<th>February 26-May 13, 2007 (11 weeks)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of employees in data set</td>
<td>2236</td>
</tr>
<tr>
<td>Self-Sufficiency Workers</td>
<td>854</td>
</tr>
<tr>
<td>Child Welfare Workers</td>
<td>1367</td>
</tr>
<tr>
<td>Used the product at least once</td>
<td>422</td>
</tr>
<tr>
<td>Used the product only once</td>
<td>51</td>
</tr>
<tr>
<td>Average number of uses for the total group over the 11 week period</td>
<td>3.4</td>
</tr>
<tr>
<td>Average number of uses by actual users (422) over 11 week period</td>
<td>18</td>
</tr>
<tr>
<td>Average number of words per use</td>
<td>718</td>
</tr>
<tr>
<td>Total Cost for the 11 week period</td>
<td>$68,994</td>
</tr>
<tr>
<td>Cost per use</td>
<td>$9</td>
</tr>
<tr>
<td>Average cost per user (422) for 11 weeks</td>
<td>$163</td>
</tr>
<tr>
<td>Cost per average user per year (52 weeks)</td>
<td>$773</td>
</tr>
</tbody>
</table>

b. Dragon Naturally Speaking Costs

Data Source: DHS—The costs of using Dragon Naturally Speaking are all up-front costs. The purchase of the software costs $167.83 per person for the preferred version. In addition, the DHS found the software performed much better when used with noise reducing headsets. Noise reducing headsets cost $25 each. Based on these two expenses, the total cost of using Dragon Naturally Speaking is $192.83 per person. DHS was able to buy digital voice recorders for $97 each. With the addition of a digital voice recorder, the total price for Dragon Naturally Speaking goes up to $289.83. Hardware such as headsets and digital voice recorders are always susceptible to normal wear and tear, and as such, may need to be replaced from time to time.
Table 7: DNS Costs

<table>
<thead>
<tr>
<th>Software</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>DNS preferred software</td>
<td>$167.83</td>
</tr>
<tr>
<td>Noise reducing headsets</td>
<td>25.00</td>
</tr>
<tr>
<td><strong>Sub-Total</strong></td>
<td><strong>192.83</strong></td>
</tr>
<tr>
<td>Digital Voice Recorders</td>
<td>97.00</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$289.83</strong></td>
</tr>
</tbody>
</table>

C. Comparison of costs and benefits

Data Source: DHS, Statewide SpeakWrite Survey, SpeakWrite Data, Oregon City User Group—The calculations on Table 8 are based on the following:

1) SpeakWrite and Dragon Naturally Speaking costs were calculated using the cost data presented above. Public Knowledge assumed the total number of caseworkers who could potentially use the product to be the same number as those previously given access to SpeakWrite—2,186. We also calculated costs based on percentages of caseworkers who might use the product.

2) For SpeakWrite, the costs were doubled to calculate 2-years worth of costs. For Dragon Naturally Speaking, the costs remained the same as for one year as we assumed the equipment and software would last for at least two years.

3) DHS provided Public Knowledge with level II monthly salary information for the positions listed on the statewide survey (case manager, caseworker, eligibility worker, protective services worker, social services assistant, certifier and manager) for both Child Protective Services workers and Self-Sufficiency workers. Based on the monthly salaries reported by DHS and the time saved per week reported by survey respondents, we calculated annual savings. From this we subtracted the annual cost of using SpeakWrite to get our SpeakWrite estimate. For costs saved for Dragon Naturally Speaking we went back to the survey of Oregon City users. We found that on average workers reported Dragon Naturally Speaking saved them just over one hour per week. We used the average salary of SpeakWrite users as reported to us by DHS to calculate the value of hours saved, assuming the average salary for users who would use SpeakWrite to be the same as those.
who would use Dragon Naturally Speaking. From this we subtracted the annual cost of Dragon Naturally Speaking to get our estimate.

4) Row four reflects the same assumptions as row three, but calculated for two years of product use and costs.

<table>
<thead>
<tr>
<th>Assumption</th>
<th>Description</th>
<th>SpeakWrite</th>
<th>Dragon Naturally Speaking (without digital voice recorder)</th>
<th>Dragon Naturally Speaking (with digital voice recorder)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>One-year cost</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>25 percent of caseworkers (547)</td>
<td>$422,444</td>
<td>$105,382</td>
<td>$158,392</td>
</tr>
<tr>
<td></td>
<td>50 percent of caseworkers (1093)</td>
<td>844,889</td>
<td>210,763</td>
<td>316,784</td>
</tr>
<tr>
<td></td>
<td>70 percent of caseworkers (1530)</td>
<td>1,182,844</td>
<td>295,068</td>
<td>443,498</td>
</tr>
<tr>
<td></td>
<td>All caseworkers (2186)</td>
<td>1,689,778</td>
<td>421,526</td>
<td>633,568</td>
</tr>
<tr>
<td>2.</td>
<td>Two-year cost</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>25 percent of caseworkers (547)</td>
<td>$844,889</td>
<td>$105,382</td>
<td>$158,392</td>
</tr>
<tr>
<td></td>
<td>50 percent of caseworkers (1093)</td>
<td>1,689,778</td>
<td>210,763</td>
<td>316,784</td>
</tr>
<tr>
<td></td>
<td>70 percent of caseworkers (1530)</td>
<td>2,365,689</td>
<td>295,068</td>
<td>443,498</td>
</tr>
<tr>
<td></td>
<td>All caseworkers (2186)</td>
<td>3,379,556</td>
<td>421,526</td>
<td>633,568</td>
</tr>
<tr>
<td>3.</td>
<td>One-year dollars saved less costs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>25 percent of caseworkers (547)</td>
<td>$1,484,882</td>
<td>$418,662</td>
<td>**</td>
</tr>
<tr>
<td></td>
<td>50 percent of caseworkers (1093)</td>
<td>2,969,765</td>
<td>837,324</td>
<td>**</td>
</tr>
<tr>
<td></td>
<td>70 percent of caseworkers (1530)</td>
<td>4,157,671</td>
<td>1,172,254</td>
<td>**</td>
</tr>
<tr>
<td></td>
<td>All potential caseworkers (2186)</td>
<td>5,939,531</td>
<td>1,674,649</td>
<td>**</td>
</tr>
<tr>
<td>4.</td>
<td>Two-year dollars saved less costs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>25 percent of caseworkers (547)</td>
<td>$2,969,765</td>
<td>$942,706</td>
<td>**</td>
</tr>
<tr>
<td></td>
<td>50 percent of caseworkers (1093)</td>
<td>5,939,531</td>
<td>1,885,412</td>
<td>**</td>
</tr>
<tr>
<td></td>
<td>70 percent of caseworkers (1530)</td>
<td>8,315,343</td>
<td>2,639,577</td>
<td>**</td>
</tr>
<tr>
<td></td>
<td>All potential caseworkers (2186)</td>
<td>11,879,062</td>
<td>3,770,824</td>
<td>**</td>
</tr>
</tbody>
</table>

**Savings could not be calculated in this field as Dragon Naturally Speaking users did not have the opportunity to test the product with digital voice recorders.
Interpreting Table 8
As presented in Table 8, both products appear to save DHS more money with use by larger numbers of caseworkers. Important to consider, however, is that these estimates are based on user estimates of hours saved. Especially true in the case of SpeakWrite, those workers that had the most to gain by using the product were more likely to opt to use it, while those who had less to gain, may have self-selected out of the study. A caseworker with limited typing skills or ability, for example, might find SpeakWrite more valuable than a caseworker with superior typing skills. As a result, the first caseworker may have used SpeakWrite frequently and reported a higher number of hours saved than would the second caseworker in the example. According to SpeakWrite data, 422 caseworkers opted to use the product during the study period. Their reports of hours saved may not represent the average hours saved by workers when all 2,186 caseworkers use the product. Table 8 assumes constant rates of time saved with increasing workers whereas in practice the benefits would likely demonstrate diminishing returns.

In addition, the cost comparisons are limited to benefits that can be quantified in dollars—the cost of hours saved based on the average salary of caseworkers. Our study also shows important benefits of SpeakWrite in improved quality of case notes, and potential benefits in timeliness with which case notes are entered into DHS databases. These non-financial benefits, however, are not taken into consideration in the dollars saved less costs calculated above.

VI. CONCLUSIONS

A. SPEAKWRITE PERFORMED AT LEAST MODERATELY WELL ON THE THREE TIME AND QUALITY GOALS PUT FORTH BY DHS
SpeakWrite saved users time and improved the quality of their case notes.

- **Spend less time writing case notes, narratives, and assessments**—Eighty-four percent of SpeakWrite users reported that SpeakWrite saved them at least some time every week, as compared with just 36 percent of Dragon Naturally Speaking users.
Shorten time between client interaction and writing case notes—SpeakWrite users produced mixed results in the timeliness with which they entered data into two databases used by DHS. Dragon Naturally Speaking users showed the greatest consistency over time in entering their assessments in DHS’s CPS database within 14 days of the contact. SpeakWrite users consistently had the highest percent their assessments entered into the FACIS system, but none of the three groups increased the percent of assessments entered into the system over time.

Improved quality of case notes, narratives, and assessments—When measured for quality, the case notes, narratives, and assessments of those workers using SpeakWrite scored higher in a peer review than those of either Dragon Naturally Speaking users or the control group.

B. SPEAKWRITE IS MORE EXPENSIVE THAN DRAGON NATURALLY SPEAKING BUT ITS ANNUAL SAVINGS ARE POTENTIALLY GREATER

SpeakWrite is a more expensive product than Dragon Naturally Speaking, but also shows the potential to provide greater savings to DHS.

Cost effective—Whereas Dragon Naturally Speaking requires only one-time costs of purchasing software and hardware, SpeakWrite is paid for on a per-use basis. Therefore, once the initial purchase of Dragon Naturally Speaking is made, the costs are contained, while with SpeakWrite, the more it is used, the more it costs. Oregon City users of Dragon Naturally Speaking, however, reported much lower rates of time saved using the product than the SpeakWrite users did. When the higher rates of time saved reported by SpeakWrite users are converted into dollars, SpeakWrite gains a considerable advantage in dollars saved less costs (see Table 8). Some of the reason for the lower usage estimates by the Dragon Naturally Speaking users may have had to do with initial frustrations with the headsets. Our conversations with users of Dragon Naturally Speaking users at Oregon City reflected comments such as, “It would be great if it worked the way it was supposed to.”

C. DRAGON NATURALLY SPEAKING RESULTS INCONCLUSIVE

While SpeakWrite performed well on the goals put forth by DHS, Dragon Naturally Speaking’s results were largely inconclusive. Most users of Dragon Naturally Speaking did not report saving much, if any time using
the product. The quality of case notes written by Dragon Naturally Speaking users was marginally better than the control group, but was not to the level of the SpeakWrite users. Dragon Naturally Speaking is less expensive than SpeakWrite, but since workers did not report as many hours saved as SpeakWrite users did, the savings to cost measure is much smaller than that of SpeakWrite. In the Oregon City study, users of Dragon Naturally Speaking experienced technical difficulties with their headsets and had much less time to use the product than did users of SpeakWrite. To make a fair assessment of the value of Dragon Naturally Speaking, the product would need to be studied with a larger group and for a longer period of time.

D. OPTIMUM LEVEL OF USE YET TO BE DETERMINED

Although SpeakWrite is more expensive than Dragon Naturally Speaking, it also saves DHS more money in time saved. The benefits of either product could be increased if more workers used it, and used it more frequently. We can expect, however, that the benefits of either product would demonstrate diminishing returns after the point at which all of those users who were most likely to save time by using a product were doing so. The optimum level of number of users would include all workers who indicate the product saves them time and excludes users who report the product does not save them time.

E. OTHER ACCOMMODATIONS SHOULD BE CONSIDERED

In addition, with more caseworkers using either product, there are other considerations and accommodations that DHS should account for. With more caseworkers dictating orally, work spaces could get very noisy. In addition, the ability of clients to overhear caseworkers dictating at their desks is also a concern. These concerns might be addressed with noise diminishing cubicles or the increased availability of quiet rooms where caseworkers could go to dictate notes.

Caseworkers also noted that DHS does not pay for cell phones or cell phone usage for caseworkers who call in to SpeakWrite from a remote location. Workers may be more likely to use the product if they were reimbursed for using their personal cell phone minutes or if they were provided a cell phone by DHS to use to call in case notes.

Increasing the number of templates available to caseworkers would also increase their use of SpeakWrite. Templates provide formatting to the notes when they are transcribed and allow for easy transfer from the emailed version to the appropriate database.
VII. RECOMMENDATIONS

A. UTILIZE SPEAKWRITE FOR ELECTRONIC DICTATION

Public Knowledge recommends that DHS use SpeakWrite for staff that must record case notes. We further recommend that DHS provide workers with the support they need to make greater use of the SpeakWrite product. That support includes:

- Continued training on the product and its benefits,
- Encouragement to learn to use the product,
- More templates to make the product more effective for more users.

In addition, DHS should inform the SpeakWrite company of the variation in quality of transcriptions caseworkers are receiving and work with SpeakWrite to resolve the issue.

B. CONSIDER THE NEEDS AND COSTS OF ACCOMMODATIONS ASSOCIATED WITH BROAD USE OF SPEAKWRITE

Public Knowledge recommends that DHS study the need for accommodations that would allow greater usability of the product including:

- Noise diminishing cubicles,
- Availability of quiet rooms for dictating case notes,
- Reimbursement for cell phone use or the provision of cell phones.

These accommodations will increase the cost of using SpeakWrite. Public Knowledge recommends that DHS study the potential costs of these accommodations to determine whether SpeakWrite would still be cost effective with the accommodations in place.

C. MONITOR SPEAKWRITE BENEFITS TO DETERMINE OPTIMUM NUMBER OF USERS

Public Knowledge recommends that DHS continue to monitor the benefits of time saved and improved quality of notes as more workers use the product. To determine the optimum number of caseworkers to use SpeakWrite, DHS should continue to periodically survey users on their use patterns and estimates of time
saved. When the number of users continues to grow and the average hours saved per worker grows or stays constant, the optimum level has not yet been reached. When the number of users grows but the average hours saved per worker begins to diminish, the optimum number of users has been surpassed. Similarly monitoring the quality of case notes would also provide information on the optimum number of users.

**D. CONTINUE TO MONITOR THE QUALITY OF DRAGON NATURALLY SPEAKING**

Public Knowledge does not recommend that DHS continue to use Dragon Naturally Speaking at this time. Rather, Public Knowledge recommends that DHS continue to monitor the quality of Dragon Naturally Speaking software. If the quality of software becomes more accurate and user-friendly, it may become more economical for DHS.