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Questions of Step 2：

a. In how many different ways might this task be done?

There are many ways to complete the task. On my perspective, the two main way that can be used is as follow:

1. Using mouse to select exact word and replace it;
2. Using keyboard move the editing point near the word. Then type it after deleting the word by using keyboard.

b. Are some ways more efficient than others?

It is obvious that the first way is more efficient than the second way above.

c. How much more efficient?

Considering the first way, we only need to navigate the mouse and double the word to type. Whereas the second way, we need to have multiple press on keyboard to negotiate the editing point, Only after we press multiple times on keyboard to delete the letters, we can type. Therefore, the first way is more efficient than the second way because it save time on keystroke.

d. In general, how long can we expect Microsoft Word users to perform each individual step of this task?

The answer is shown at the KLM model graph.

Step-by-step human procedure.

Assume that the hands of participants are initially on the keyboard, and the initial state is exactly on the editing page of Microsoft Word.

a. Type in "Is this a dagger that I see before me?"
   Mentally prepare for typing
   Type in "Is this a dagger that I see before me?"
b. Replace "dagger" with "squirrel".
   Home to mouse
   Point at "dagger"
   Double click on "dagger"
   Home to keyboard
   Mentally prepare for typing
   Type “squirrel ”
c. Italicize "see".
   Home to mouse
   Point at “see”
   Double click on “see ”
   Point at Italicize
   Click on Italicize
d. On a new line, type "I have thee not yet I see thee still."
   Home to right side of the last letter
   Home to keyboard

Mentally prepare for typing
Press Enter and type “I have thee not yet I see thee still.”

e. Replace all instances of "thee" with "you".
Home to the mouse
Point at the first “thee”
Double click on the first “thee”
Home to the keyboard
Mentally prepare for typing
Type “you ”
Home to the mouse
Point at the second “thee”
Double click on the second “thee”
Home to the keyboard
Mentally prepare for typing
Type “you ”

f. Replace "me" with "my very eyes".
Home to the mouse
Point at the “me”
Double click on the “me”
Home to the keyboard
Mentally prepare for typing
Type “my very eyes ”

g. Underline "squirrel".
Home to mouse
Point at “squirrel”
Double click on “squirrel”
Point at Underline
Click on Underline

h. Save the document as "dagger.doc".
Point at File on the left-top side
Click on File
Click on Save As
Point at the file name
Click on the file name
Home to keyboard
Mentally prepare for typing
Type “dagger”
Press Enter

KLM model

#	Task Step Description	KLMModel Derivation	Time Prediction
1.	Mentally prepare for typing	M	1.20
2.	Type in "Is this a dagger that I see before me?"	38*K	10.64
3.	Home to mouse	H	0.40
4.	Point at "dagger"	M	1.20
5.	Double click on "dagger"	P	1.10
6.	Home to keyboard	H	0.40
7.	Mentally prepare for typing	M	1.20
8.	Type “squirrel ”	9*K	2.52
9.	Home to mouse	H	0.40
10.	Point at “see”	P	1.10
11.	Double click on “see ”	BB	0.40
12.	Point at Italicize	P	1.10
13.	Click on Italicize	B	0.20
14.	Home to right side of the last letter	H	0.40
15.	Home to keyboard	H	0.40
16.	Mentally prepare for typing	M	1.20
17.	Press Enter and type “I have thee not yet I see thee still.”	38*K	10.64
18.	Home to the mouse	H	0.40
19.	Point at the first “thee”	P	1.10
20.	Double click on the first “thee”	BB	0.40
21.	Home to the keyboard	H	0.40
22.	Mentally prepare for typing	M	1.20
23.	Type “you ”	4*K	1.12
24.	Home to the mouse	H	0.40
25.	Point at the second “thee”	P	1.10
26.	Double click on the second “thee”	BB	0.40
27.	Home to the keyboard	H	0.40
28.	Mentally prepare for typing	M	1.20
29.	Type “you ”	4*K	1.12

30.	Home to the mouse	H	0.40
31.	Point at the “me”	P	1.10
32.	Double click on the “me”	BB	0.40
33.	Home to the keyboard	H	0.40
34.	Mentally prepare for typing	M	1.20
35.	Type “my very eyes ”	13*K	3.64
36.	Home to mouse	H	0.40
37.	Point at “squirrel”	P	1.10
38.	Double click on “squirrel”	BB	0.40
39.	Point at Underline	P	1.10
40.	Click on Underline	B	0.20
41.	Point at File on the left-top side	P	1.10
42.	Click on File	B	0.20
43.	Click on Save As	B	0.20
44.	Point at the file name	P	1.10
45.	Click on the file name	B	0.20
46.	Home to keyboard	H	0.40
47.	Mentally prepare for typing	M	1.20
48.	Type “dagger”	6*K	1.68
49.	Press Enter	K	0.28
		Total time	60.44

Summary table

Task step	P1 Time	P2 Time	P3 Time	Participant Average	KLM Prediction	% error
Task a	15.1	13.3	12.3	13.57	11.84	14.6%
Task b	8.2	6.7	7.0	7.3	6.82	7.0%
Task c	2.9	3.1	2.8	2.9	3.2	−9.4%
Task d	15.1	13.5	12.4	13.7	12.64	8.4%
Task e	11.6	10.1	10.2	10.6	9.24	14.7%
Task f	7.3	7.8	7.3	7.5	7.14	5.0%
Task g	3.5	3.2	3.1	3.3	3.2	3.1%
Task h	8.8	7.1	7.0	7.6	6.36	19.4%
Whole Tasks	72.5	64.8	62.1	66.5	60.44	10.0%

As we can see from the Summary table, the errors of each step and the whole task are all less than 20%; This means that my KLM model works well. Also, wonderful results are that, for task b, c, d, f and g, the errors are less then 10%. However, for task a, e, and h, the errors are all over 10%, and I found that those tasks are all include with typing. Maybe this is because the participants are not that good at typing letters with Microsoft Word. Therefore, I think I need to adjust the time of single keystroke or mental preparation to bring my model into accordance.