# How Doodles Facilitate Learning: Attention, Retention, and Comprehension

**Chi-yu Chang, Ph.D.**

Department of Applied English, Ming Chuan University

***Corresponding author:** Chi-yu Chang, Ph.D.

Department of Applied English, Ming Chuan University

## Abstract

*Psychology and neuroscience findings show positive correlation between doodling as a learning tactic and memory retention as a result. This appears antithetical to what has been assumed to be true – doodlers are those absent-minded during class. The aforementioned discrepancy kindles my interest in exploring whether and how doodles worked to undergraduate attendees, so this paper, inspired by Sunni Brown, an American author well-known for her promotion of doodles as a creative way to learn, is intended to explore whether and how doodles worked to undergraduate attendees. The subjects in question, most of whom were English majors whose mother tongue was Mandarin, signed up for a class where English was used as the medium of instruction. They were required to apply icons, charts, graphs, and sketches to note-taking. I often played it by ear on doodle demonstration to the subjects; when necessary, I acted as a partner ready to share advice on their request. A semester-end survey consisting of 20 items (response rate = 94%) was conducted to see whether teacher's guidance helped, how doodling facilitated learning in a classroom learning setting, and whether the subjects became susceptible to doodling when such variables as oral expressions and division of labor were taken into account. The results disclose that doodles pan out well for learners in these categories: deep thinking, attention retention, memory retention, takeaways scanning, conclusion drawing, linearity sensing, idea creation, causation comprehension, and status-quo subversion. What remains to be questioned includes unbound doodles and compulsory teamwork.*

**Keywords:** *pedagogy, InfoDoodle, learner autonomy, classroom management*

## Introduction

Doodling, an inherent behavior commonly conducted among humans, is a working channel through which meanings are symbolically created and conveyed. It can be traced back to the cave arts in prehistorical venues, and now it has been found with a lot more psychoanalytical and pedagogical insights (Qutub, 2012).

What is held as a part of childhood memory for many is classroom doodling, alluding to contexts where boredom and doldrums occur. As a college teacher who has been confronting big classes, I have tried a variety of ways to academically mobilize my students in different classes, and they often worked not so well as expected

until my attempts to apply doodling to classroom management, which definitely has gone through a breaking-in stage. This paper is a reflection on my first attempt to apply doodling to class in terms of what has been thought of as effective and problematic. What I am addressing here is an experiment I did to my students who took the *American Culture* class in the spring semester of 2016. As below is a description of how the class was kept going.

The way I managed this 3-hour class is characterized by my oral demonstration through my real-time, impromptu doodle work on the board first and face-to-face, one on/by one interaction between students and the teacher, me, next. A textbook that had been published by the U.S. Department of State was selected to bring classroom participants basic pieces of information that help preliminarily understand the chosen topics as planned and assigned in the course syllabus. The roll calls were not given in class but through my students' substantive participation. That's why the students would have to sign on their own doodle works to earn a daily grade and prove their attendance. Because a few students were found with a problem of late arrival, after the midterm week, every time in class during the second hour I chose to mark on each attendees' doodle draft to encourage punctuality, and certain follow-up roll call would be based on the marks left. The highest doodle points earned prior to the midterm week would be plucked for the midterm grade, taking 30% of the total grade. In accordance with the syllabus topics, all doodles should be completed and submitted by the end of each class. Any student whose doodle was regarded as unsatisfactory would be given a chance to redo it until it reaches survival threshold.

Before this attempt, I never did doodling in any other classes. What I usually adopted is my unilateral lecture which bored students first and the ensuing group discussions for which most students rarely cared, let alone being engaged. With the passage of time since the adoption of doodling methods, my tentative findings are that many students, in the beginning, behaved hesitant, if not resistant, when what needs to be done during the semester was just announced and explained in our first meeting, that it took about 3 weeks at least to gradually turn them used to the classroom requirements and doodling regulations, which I deemed a must that assures the effectual practice through doodles, and that when the students became focused, they tended not to be bothered or interrupted despite my enthusiasm and my role as a knowledge facilitator plus doodle adviser. However, I was not alone with the fact that many other teachers in the world had tried similar methods, and my class based on such an unconventional pedagogy ultimately panned out.

## Literature Review

Doodling has been taken as a negative behavior alluding to inattention and playfulness. Such a prejudice wouldn't have held if it had been taken as a potential way to mobilize learners for positive effects. Jackie Andrade (2009) as a psychologist and William R. Klemm (2015) as a neuroscientist both found that doodling facilitates memorization[1]. The former further pointed out that doodling helps avoid "daydreaming". The latter advocated that doodling helps young learners synthesize more through images (Klemm, 2007: 68). A simple application of doodles was ever tried

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[1] Klemm's finding was also reported by Katrina Schwartz in her blog "Making Learning Visible: Doodling Helps Memories Stick" in KQED, retrieved from https://ww2.kqed.org/mindshift/2015/07/15/making-learning-visible-doodling-helps-memories-stick/

and suggested to the field of mathematics in higher education, and they were believed to orient learners toward problem reasoning processes in a profound manner (Vakil, 2011). As a doodle advocate, Sunni Brown (2014) proposed a set of ideas presumed helpful for power, performance, and pleasure. She created the term infodoodling which addresses and incorporates data and doodles. As reported by Shellenbarger (2014), doodlers were found more capable of memorizing information than those who didn't. Chan (2012) through a different perspective indicated that doodling, characterized by visual supports, might not work well to memory if its assigned tasks were also designed for visual purposes. Nevertheless, doodling as an approach to idea conveyance was found beneficial for k-12 kids when it refers to the reinforcement of attention, memorization, innovation, and mental and artistic preparation for learning (Aquino, 2013). The review by Gupta (2016) helped justify doodling as a useful tool for memory enhancement and better task performance.

Despite Brown's inspirational experience, classroom doodlers would probably have to experience certain trial-and-error stages to make what had been promised come true. My class was an example where I started with a false assumption that doodling is easy to most students especially provided that the rubrics and the rules for doodles are sufficiently explained to them, then I slowed down and chose to proceed incrementally, and later on my students were found more autonomous and attentive than those I ever taught in the past. To make clear what happened and how things went and changed in class, I finally invited my students to answer to a survey, which I had not announced at the start of the semester. My thinking is that they would have performed in an unnatural, pretentious way if the survey request had been made before much work being done.

## Methodology

As the teacher who took charge of the class, not simply did I observe what happened to my students but I operated variables such as providing post-class (giving my written comments on all doodles submitted and sharing best doodles of the week) and in-class guidance (a regularly-held lecture lasting about an hour each time), attempting to talk with classroom participants for idea exchanges, and spending much time after class evaluating every doodle work turned in through the rubrics. By the end of the semester, I handed out the hard copies of a survey in class, where my students present were requested to answer to it. In the classroom with which we are all familiar, the survey respondents were welcome to take time, and once they got finished, the answered copies were submitted. After submission, I transcribed the survey results with care from paperwork to the SPSS software.

Among the 62 students who took the class, 58 were junior college students, and the females were a little more than males. There are also 58 students filling out the survey, so the response rate is 94%, which is high enough to help support the reliability. Usually those of which the rate over 50% would be regarded as acceptable (Rubin and Babbie, 2011: 388). Besides, according to the statistic results calculated by SPSS, Cronbach's Alpha of the survey turns out 0.759[2]. A coefficient threshold like 0.7 has often been recommended to researchers: the higher the more reliable (Peterson, 1994: 381).

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[2] See Table 1.

All 20 "questions" in the survey, designed in a statement form without any question marks, are based on the 5-point Likert Scale from 1 to 5, the degrees between strong disapproval and strong approval, of which the middle is meant for neither disapproval nor approval. The survey is divided into 3 categories: what doodles are and seem to learners (statement 1 to 3), how effective or conducive doodles are to learning (statement 5 to 15), and whether moderator variables facilitate infodoodling like rubrics (statement 4), attempts to share and talk (statement 16 to 18), external guidance (statement 19), and the way the doodles could be better managed (statement 20).

**Table 1.**

**Reliability Statistics**

| Cronbach's Alpha | N. |
|---|---|
| **.759** | 20 |

**Table 2.**

**Item – Total Statistics**

| Survey Statements | M | SD | Corrected Item – Total Correlation | Cronbach's Alpha If Item Deleted |
|---|---|---|---|---|
| S1 | 4.16 | 0.72 | .368 | .747 |
| S2 | 3.64 | 0.69 | .439 | .742 |
| S3 | 4.19 | 0.61 | .455 | .743 |
| S4 | 4.02 | 0.61 | .419 | .745 |
| S5 | 4.12 | 0.62 | .465 | .742 |
| S6 | 4.26 | 0.64 | .348 | .749 |
| S7 | 4.16 | 0.70 | .325 | .750 |
| S8 | 4.14 | 0.74 | .420 | .743 |
| S9 | 4.24 | 0.66 | .471 | .741 |
| S10 | 4.16 | 0.70 | .437 | .742 |
| S11 | 4.14 | 0.66 | .368 | .747 |
| S12 | 3.64 | 0.69 | .457 | .741 |
| S13 | 4.14 | 0.76 | .364 | .747 |
| S14 | 3.86 | 0.71 | .308 | .751 |
| S15 | 3.55 | 0.80 | .440 | .741 |
| S16 | 3.53 | 0.75 | .522 | .735 |
| S17 | 4.00 | 0.90 | .212 | .760 |
| S18 | **3.19** | 0.98 | .144 | **.767** |
| S19 | 3.22 | 0.94 | .132 | **.767** |
| S20 | 3.66 | **1.07** | -.130 | **.795** |

What came after my collection of the survey filled out was to transform its data into something visually and graphically friendly. The free online service as https://www.mathsisfun.com/data/data-graph.php helped me turn each survey item into a pie chart, expressed as a percentage and thus divided by specific shares based on the Likert points. This wouldn't have been made possible if the data retrieved from the survey had not been correctly summed up and transcribed onto an Excel file with patience. With a double-check of the original copies of the survey submitted, I found that one of the respondents ignored the 19th item of the survey without

making a choice among the 5 points. Because "undecided" is the term exactly used for "neutral" in this survey, choosing nothing could be broadly understood as not making any decision or "no comments". I also found that item 18 and 19 are stated in a reverse manner. It is because, unlike the rest of the items, both statements are expressed against the facts that I often witnessed and observed in class. This in a sense makes their SD higher, confuses the respondents, and turns out the lowest means. The 20th item, mentioning teamwork doodling could be what seems undesirable to the respondents, has the largest SD probably because the statement ignores that fact that the class participants were never requested to be engaged in doodle activities by teamwork.

To clearly demonstrate my findings and analyses as shown below, I would choose to express them through the present tense with an awareness that such experimental situations and the data retrieved thereof could be understood as certain factual statements or explanations. I hope such an expedient manner will help the readers better understand and more virtually feel how things went at that time.

## Results

According to the survey, when asked about whether they "understand what infodoodling is about", 83% of the respondents give an affirmative reply, including those expressing "strongly agree" (32.21%; n=19) and "agree" (50.8%; n=30). The only respondent showing negation takes 1.7%, while those staying neutral take 15.3% (n=9). When mentioning "infodoodling is easy to get accustomed to", the survey collects 6.9% of the responses saying not being able to agree more (n=4), 56.9% saying yes (n=33), 31% with no comments (n=18), and 5.2% saying no (n=3). When seeing infodoodling as interesting, it gains 89.6% of the responses expressing affirmation, including those with strong approval (29.3%; n=17) and approval (60.3%; n=35), without any voices showing denial. As indicated above are what doodles are and how they feel to my students.

When reading the S that infodoodling helps them pay full attention, 88% of the respondents express affirmation, among whom 25.9% are for "strongly agree" (n=15) and 62.1% are for "agree" (n=36). No one shows disapproval, and there are only 12.1% of the respondents sitting on the fence (n=7). When the survey regards infodoodling as helpful in deep thinking, 89.6% of the responses, consisting of the

most affirmative voices that take 36.2% (n=21) and the affirmative ones that take 53.4% (n=31), are for such a S. No voices are against it, while only 10.3% express neutrality (n=6). When the survey stresses how infodoodling helps to emphasize what appears important, 86.2% of the respondents agree, including 31% who choose "strongly agree" (n=18) and 55.2% who choose "agree" (n=32), while 12.1% remain neutral (n=7); only one respondent disagrees (1.7% of the survey answerers). When it comes to infodoodling as a facilitator for memorization of facts, except a respondent afraid not (1.7% for "disagree"), 15.5% of the respondents choose neutrality (n=9), while 82.8% tend to agree, consisting of 32.8% with strong approval (n=19) and 50% with approval (n=29). In regard to whether infodoodling helps them understand cause and effect relationship, except one respondent casting doubt, 6.9% of the respondents tend to show no opinion (n=4) while 91.4% show affirmation, composed of 34.5% with strong agreement (n=20) and 56.9% with agreement (n=33). When thinking of infodoodling as conducive to conclusion drawing or

ideas generalizing, the survey receives 19 strongly affirmative voices (32.8%) and 31 affirmative voices (53.4%) with 7 neutral voices (12.1%) and a negative voice. As to whether infodoodling helps them "learn how things are developed", 84.5% of the respondents tend to approve, including 29.3% with strong agreement (n=17) and 55.2% with agreement (n=32), while neither neutrality nor negation is expressed. When the survey refers to whether infodoodling facilitates problem solving and question answering, it gains 55.1% of the responses that show approval, consisting of 10.3% (n=6) with strong agreement and 44.8% (n=26) with agreement, while 43.1% of the respondents choose to reserve their opinion (n=25) except one negative voice. On whether infodoodling helps them "create new ideas", 77.6% of the survey answerers tend to affirm it, composed of 36.2% with strong approval (n=21) and 41.4% with approval (n=24), while 22.4% stay neutral (n=13) and there is no negative response. Speaking of whether infodoodling helps them "challenge what is taken for granted", the survey receives 70.6% of the responses showing affirmation, which means 17.2% with strong agreement (n=10) and 53.4% (n=31) with agreement, and 27.6% reserving their opinion (n=16) except a negative response. When the survey states that infodoodling helps "notice what has been ignored", 53.4% of the respondents tend to agree, consisting 10.3% with strong approval (n=6) and 43.1% with approval (n=25), 37.9% sit on the fence (n=22), and 8.6% disagree (n=5). As indicated above are what doodles do and how they work to learning for my students.

In regard to whether the rubrics help them better perform infodoodling, 11 respondents strongly agree, which take 19% of the survey answerers, and 37 respondents agree, which take 63.8%. In other words, the affirmative voices take 82.8% of all answerers. There are not negative responses at all but 10 (17.2%) for neutrality. On completion of their doodles, a half of the respondents, including 10.3% who strongly agree (n=6) and 39.7% who agree (n=23), tend to "have a dialog with the teacher", while those who remain neutral take nearly the other half of the respondents (46.6%; n=27); only 3.4% (n=2) strongly disagree. In a similar situation, on one hand, 75.8% of the respondents like to observe their classmates' doodle works, composed of 31% with strong approval (n=18) and 44.8% with approval (n=26), while 3,4% and 1.7% respectively express disapproval (n=2) and strong disapproval (n=1), and 19% remain neutral (n=11). On the other hand, only 34.4% of the respondents, including those who cannot agree more (10.3%; n=6) and those who agree (24.1%; n=14), are willing to explain their own doodle works to classmates. In terms of this, 43.1% choose neutrality, while 19% (n=11) and 3.4% separately show unwillingness and strong unwillingness. As to whether a doodle is expected to be completed alone, on one hand, 45.6% of the responses, consisting of 3.5% with strong affirmation (n=2) and 42.1% with affirmation (n=24), agree that infodoodling can be done without any guidance, and less than a half of such responses (21.1%), consisting of 15.8% (n=9) with denial and 5.3% (n=3) with strong denial, tend to disagree; about one third (33.3%; n=19) reserve their opinion. On the other hand, 60.3% would rather engage themselves in infodoodling by every individual alone, including 22.4% (n=13) with strong agreement and 37.9% (n=22) with agreement, than by teamwork, where the percentage of those who choose disagreement and strong disagreement goes fifty-fifty, each taking 5.2% (n=3). In such a case, 29.3% opt for neutrality (n=17). As indicated above are the selected moderator variables which could facilitate my students' learning through infodoodling.

## Discussion and Conclusion

According to the survey results, almost all classroom participants think they comprehend what infodoodling is about except one. Actually in the first 3 to 5 weeks my students and I experienced a hard time during class because certain idea infrastructure had to be constructed and necessary know-hows about infodoodling had to be conveyed. In the beginning, many students were confused and not sure of what to do. Because this was a large class without any teamwork support, there was no other choice for me but keeping my students informed of what they needed to know to facilitate the learning process. I was aware that several students were not very good at painting, doodling, or graph depiction, and that the progress they made was quite limited although it has been widely advocated that infodoodling is recommended to everyone, including those without fine arts background or talent. With repeated trials and attempts, most of the students made it. The only one, a female student, seemed very annoyed whenever requested to work much better on her doodles, which later proved her obvious unpreparedness despite the small progress she ultimately made by the semester end. Maybe teachers need to remain prudent whenever infodoodling is presumed inherently helpful for the increase of learner autonomy. Something else which needs to be applied in addition to doodling like data/information retrieval from the Internet could help motivate learners.

The majority of students who mention their comprehension of what infodoodling is, taken as a refined definition of classroom doodling, explains that my pre-class announcements and explanations help. When applied to learning, doodle activities should be based on working rules for specific purposes, or they could turn out to be another source that leads to confusion and classroom chaos. When it comes to whether infodoodling is skillfully accessible to them, the number of students who agree to the previous statement declines a little. To better manage doodling, repeated exposure to practice is necessary. The thing is infodoodling is really interesting. No student denies this. The answer appears encouraging to whoever is willing to apply doodles to classroom management especially when they serve as a starting point that draws students attention back.

The abilities or effects that turn very obvious with the support of infodoodling are "causation comprehension" (CC), "deep thinking" (DT), "staying focused" (SF), "conclusion drawing" (CD), "importance search" (IS), "how things are developed" (HD), and "memory retention" (MR). Those also obvious include "new idea creation" and "challenging what is taken for granted". Those turn not so obvious but still with a majority approval rate are "problem solution" and "noticing what is ignored"[3]. Infodoodling requires 3 basic graphs – systemic, linear, and comparative – which help

**Figure 1.**



Very Obvious

78  80  82  84  86  88  90  92  94

■ MR ■ HD ■ IS ■ CD ■ SF ■ DT ■ CC

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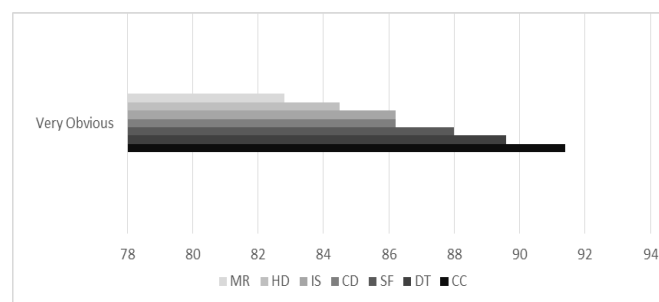
[3]  See Figure 1.

learners better construct what they have absorbed. For example, it makes sense that systemic and linear graphs are conducive to CC the best; linear graphs facilitate HD too. Comparative graphs substantively support IS. All 3 types of graphs are used to support CD, while infodoodling as an interesting job that requires action assists DT, SF, and MR.

The moderator variables that appear very influential through infodoodling include "the use of rubrics" (UR). Those which appear influential, over or the same as a half of the responses, include "peer observation" (PO), "individual doodling" (ID), and "interaction with the teacher" (IT). Those which appear not very influential, one below 46% with the other below 35%, are doodling without guidance (WG) and interaction with classmates (IC).[4] The above data illuminate the importance of necessary regulations and standards prescribed prior to the in-class practice of infodoodling, more chances expected to be given to students for cross-examination between peers, the necessity of creating an environment where students are allowed to spend sufficient time making preparations and being engaged in infodoodling, and the potential expectations of the teacher who could have done more to act as a doodling guide and the key partner with them in class. To sum up, my findings can be concluded in the 3 points as follows. First, a teacher, whose role is indispensable and irreplaceable in doodling-based classes provided that he/she has been well prepared in doodle tactics and targeted topics, could be welcome to help what the students have achieved extend from written/drawn arenas to oral/interactive arenas. Second, doodling doesn't have to be seen as a teaching revolution, the assumption of which seems subversive to what has been mostly agreed upon about classroom management; instead, it is simply an unconventional pedagogical attempt that requires incremental revision and refinement, which leaves classroom participants much room for making progress without having to cause anyone's worry and frustration. Thirdly, different

**Figure 2.**
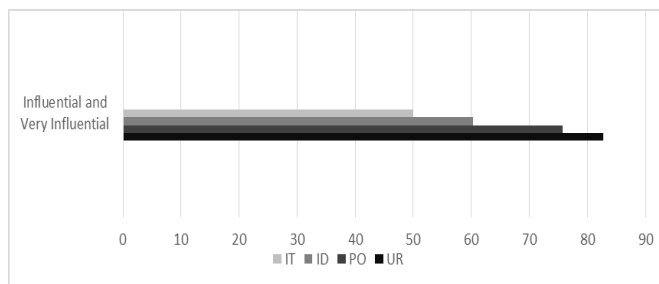


from previous studies, whose emphasis is on memory retention and attention sustaining, my case shows that doodling much better facilitates not only learners' comprehension of cause and effect relationship but also their profound reasoning and understanding of the information acquired, which are worth further exploration and testimony by later research.

Doodling is rewarding in itself; teaching is, too. My experience and findings remind me of how significant what has been completed is and how imperative what hasn't been achieved yet is. With the experimental qualities infodoodling has had and the advantages they could promise through what seems unconventional, sometimes unconsciously or subconsciously operated, classroom participants involved would be able to enjoy alternative options

that might lead them to unimaginable possibilities. Doodles are like lighthouses, shedding beams, keeping people alert, and making things visualized. For teachers and students willing to engage themselves in infodoodling, which is by no means perfect, action speaks louder than words.

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[4] See Figure 2.