



Teaching Morse Code Using a Virtual Classroom Environment

By: Rob Brownstein, K6RB; and Jack Ritter, W0UCE

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Introduction

In today's ham radio world, CW is still a very popular mode. But there are really no concerted efforts to perpetuate its use. Back in the mid-1950s, in the U.S., the novice class was introduced along with CW sub-bands carved out on 80, 40 and 15 meters. The combined effect of a CW-oriented beginner's license and an area of a spectrum dedicated to their use of CW are largely responsible for the number of still-active CW operators first licensed between 1954 and 1964. Today, with no code requirements and no sub-bands dedicated to CW learners, any newly licensed amateurs who wanted to learn code and use it were pretty much on their own.

Local radio clubs often evolved into 2 meter HT clubs primarily focused on supporting a local repeater. Interest in learning CW was often thwarted by a lack of enough interested members to warrant creating a local class as well as the lack of anyone in such clubs with the knowledge and experience to lead such a group. However, today, thanks to modern technologies, it is possible to organize groups of CW aspirants and to teach them in an efficient manner. If organized and conducted in a well-thought-out way, the CW training programs can be very effective in bringing new CW operators to the HF CW fold.

The Virtual Classroom

Ideally, it would be best to have a group of CW learners in a physical space equipped with keys, code practice oscillators (CPOs), and a qualified instructor. Practically, however, it is rare to have enough aspirants in a local area, a classroom available, and an instructor experienced in teaching CW.

The Internet, however, has given us a new tool to work with – the virtual classroom. By using a program such as OOVOO (www.oovoo.com), one can create a classroom that can accommodate up to 11 students and one instructor where everyone can see and hear everyone else. The basic requirements are a computer (any kind), broadband Internet access (DSL or cable), an inexpensive web camera/microphone accessory, a hand key, and either a CPO or transceiver with CW sidetone.

The OOVOO program is free for holding an audio/video conference with up to 12 participants. So, the cost for students and instructor is essentially the cost of whatever is lacking (computer, web cam, key, CPO). A copy-practice program such as Morse Translator can be very effective for between-session self-practice and for sending code by the instructor during sessions.

Preparation

Using OOVOO as an example, students who plan to participate would register with OOVOO and choose an ID (e.g. Joe_KD2TEN). The instructor would also have done the same. Prior to a first session, every student will have been given the instructor's ID and added him/her as a "friend." This now makes it possible for the instructor to "call" each participant, in turn, and establish the classroom. Sometime prior to the first session, all participants should use the "help" tab and "check out..." tab to test video, speaker/headphone, and microphone.

All students and instructor should use headphones to prevent audio feedback and echoing during the session. The microphone can be the one embedded in the web cam or a separate one.

A Typical Session

With all students informed about schedule days/times, a few minutes before the session begins, the instructor should look at the friends list and see which students are online. He/she should begin calling those who are online and bringing them into the classroom. Once all students who are online have been called and joined to the session, it can begin.

The sessions that have been done, so far, involved either three days/times per week or two days/times per week. In the three-day sessions, the duration has been approximately 30 minutes. In the two-day sessions, they typically run 45 minutes to an hour.

Students are required to practice on non-session days for at least 30 minutes broken into two, 15-minute periods (for optimum attention span).

When a session begins, the instructor should invite any questions and determine that all students are able to see and hear one another and the instructor. Once that has been done, the instructor can organize the session in any way that works for him and the group. For example, a session could begin with a review of all letters, numbers, and punctuations learned to date. One way to do that is to use the online program, Morse Translator, and type in whatever the instructor wants to send. Of course, an instructor can use his/her own keying and CPO/sidetone for sending.

The letters are sent in groups of four (e.g. t, t, t, t; e, e, e, e; a, a, a, a; etc.) and the students are advised to close their eyes and envision the letters as they hear the patterns. The code is sent with 20 wpm character rate. In one class, the instructor (Jack, W0UCE) sends the letters at a 20 wpm word

rate whereas in another a different instructor (Rob, K6RB) uses an 8-10 wpm Farnsworth word rate. Instructors should choose a set up that they prefer and that works for their students. If one decides to go with a slower word rate, it can always be increased as student progress allows. The key is to get them used to hearing characters sent at 20 wpm, so they do not count dits and dahs. They should be advised to try and visualize a letter in their head as they hear its pattern so that they associate the whole pattern with a letter. There is no writing because they need to begin head copy as soon as possible.

During the initial sessions, when letters are the only things they are learning, the instructor should prepare about 25-30 words using letter combinations. These should be sent, with a pause afterward, and the students who copy them should raise their hands. Then repeat again, and again, until all students have copied a word. Then, move on to the next one on the list, and so on. Both instructors make use of common letter combinations within words, such as “-all” and “-ell,” and often emphasize such combinations by sending a succession words containing such structures, such as “wall,” “tall,” “ball,” “fall” and “well,” “tell,” “bell,” “fell” to get students used to hearing the combinations rather than the individual characters.

As students learn numbers, the session can begin including callsign practice. So, after having sent the word list, the instructor can send a set of callsigns, one after another, using known letters and numbers. It is important to stress to the group that unlike words, where one may anticipate the next letter, callsigns are typically unpredictable. As such, it takes more focus to capture all the characters in correct succession. Let them know this is harder than copying words so that they are not discouraged if they find it more difficult.

The final part of the session can be devoted to sending practice. Here, the instructor calls on one student, sends a word until the student identifies it, then sends it again and has the student imitate that word using his/her hand key. The focus is on smooth character sending and good inter-character spacing. Once the instructor has called on each student in turn, he/she should again invite any questions or suggestions, then tell them what is going to be added before the next session and then terminate the current session.

A Syllabus

It is helpful for instructors and students, alike, to know in advance what will be covered during the course. The example syllabus, below, was given to a group where the program was organized into two sessions per week over a course of eight weeks (e.g. 16 sessions). If more sessions are done, per week, the syllabus can be organized commensurately.

With the aforementioned two-day-per-week syllabus, all the letters and numbers are learned by the middle of week 6. That leaves five remaining sessions to begin preparing the students for the actual on-air experience of CW QSOing.

Thus, during the last two and a half weeks (last five sessions), the instructor can begin simulating actual CW QSO protocols, abbreviations, and so on, so that students see what they can expect once they begin on-air operating. It is really good to get them acclimated to using abbreviations before they 'set foot' on the HF CW sub-bands. There is no better indicator of 'newbie' status than when one spells out everything during a QSO.

Week 7 should be devoted to CW QSO simulation and practice. A QSO can be simulated by the instructor calling a student and standing by. The student, then, using his/her hand key and audio source will respond to the call and send a first exchange of RST, QTH and name. Then the instructor responds with RST, QTH, name, WX and rig info, and so on. All students should have a chance to have a short QSO with the instructor during each of the two sessions.

Week 8 can be used to continue QSO simulation or to get them introduced to contest QSOing. Using a contest simulator, such as Morse Runner, the instructor can slow things down and simulate contest 'running' for the students. Here, they would be listening to both sides (e.g. the computer and instructor). Then, the instructor can simulate a contest QSO by calling a student and having them give a CWT exchange, and vice-versa.

Sample Syllabus for CW Academy Level 1

| | Letters | Numbers/Other |
|------------------|---------|---------------|
| Week 1 Session 1 | T, E, A | |
| Week 1 Session 2 | O, N, I | 1, 4 |
| Week 2 Session 1 | R, S | |
| Week 2 Session 2 | H, D, L | 2, 5 |
| Week 3 Session 1 | U, C | |
| Week 3 Session 2 | M, W | 3, 6, ? |
| Week 4 Session 1 | F, Y | |
| Week 4 Session 2 | P, G | 7, 9, / |
| Week 5 Session 1 | B, V | AR |
| Week 5 Session 2 | K, J | 8, 0 BT |
| Week 6 Session 1 | X, Q, Z | 0-9, BK |
| Week 6 Session 2 | A-Z | 0-9, QRX, QRN |
| Week 7 Session 1 | A-Z | 0-9, QRZ, QRM |
| Week 7 Session 2 | A-Z | 0-9, QRS, QSY |
| Week 8 Session 1 | A-Z | 0-9, QTH, QRU |
| Week 8 Session 2 | A-Z | 0-9, QRV, QRT |

A Week-by-Week Plan

The following lesson plans for the 16 sessions is just one possible example of how it can be done. The sessions are identified as ‘week 1 session 1; week 1 session 2; week 2 session 1’; etc. The word groups are exemplary. The instructor should put together whatever letter combinations or words he/she thinks are best suited to the class.

After each session, the instructor should email the students as a group and give them a pep talk and reiterate what is expected by the next session and encouraging them to practice during non-session days for 30 minutes per day.

Sessions Plan

Week 1 Session 1

- Call each student and assemble virtual group
- Resolve any issues with audio/video with each student – make sure each can hear code sent by instructor and by each student using his/her hand key and audio source
- Explain how to adjust hand key
- Give an overview of the program and what is expected of them
- Begin by sending first letters: T, E, A – send them in groups of 4 and tell students to close their eyes and visualize the letter as they hear the sound
- Then send letter groups: TEA, TEE, EAT, ATE, AT, TAT, ETTE one at a time, repeated until all students raise their hands
- Explain to students that though they only learned three letters, they were copying those letters sent at a 20 wpm rate.
- Remind them of the assignment of three new letters and two numbers (O, N, I, 1, 4)
- Ask if there are any questions
- End the session

Week 1 Session 2

- Call each student and assemble virtual group
- Ask if there are any questions about what was learned at previous session
- Review letters/numbers learned to date by having them sent, four times each, while students visualize the letters/numbers
- Send word groups: TEN, TON, TIN, TIE, TOE, NO, NOT, NOTE, IT, AT, ONE, NEAT, NET, NIT, NITE
- Send callsigns: N1AT, N4TE, ON4EN, TI4AA, OE1EA, AE4TT

- Explain that it is more difficult to copy a callsign in your head than copying a word; but it is a good skill to learn and will help, later, when DXing or contesting
- With sending practice, pick each student in turn and have them identify the word or callsign you are sending, and having correctly identified it, send it once more and have them 'imitate' what is sent using their hand key and audio source
- Ask if there are any questions
- Tell them they are doing well
- Remind them to practice between sessions
- Give them the new letters to learn: R, S
- End the session

Week 2 Session 1

- Call each student and assemble virtual group
- Ask if there are any questions
- Review letters/numbers learned to date by having them sent, four times each, while students visualize the letters/numbers
- Send word groups: RAT, ROT, NOR, NOT, SAT, SIT, SET, SITE, SEAT, SON, SIN, NOTES, OAR, EAR, TAR, STAR, STIR, STEER, TEAR, TEEN, REAR, RITE, STONE, STAN, NATE, ART, ARTIE, ANTON
- Send callsigns: N1RS, R4ON, S41T, NR1S, AR1E, IT4O, EA1ON, ES4IT
- Sending practice: pick each student in turn and have them identify the word or callsign you are sending, and having correctly identified it, send it once more and have them 'imitate' what is sent using their hand key and audio source
- Ask if there are any questions

- Tell them they are doing well
- Remind them to practice between sessions
- Give them the new letters/numbers to learn: H, D, L, 2, 5
- End the session

Week 2 Session 2

- Call each student and assemble virtual group
- Ask if there are any questions
- Review letters/numbers learned to date by having them sent, four times each, while students visualize the letters/numbers
- Send word groups: ALL, TELL, TALL, DEAL, THE, THEIR, DOLL, DELL, HALL, HILL, HOLE, LOAD, LEAD, LATE, LATER, SEAL, SELL, SOLE, SOLAR, REAL, ROLE, ROLL, READ, ROAD, RED, DEER, SHE, SHED, SHEER, HER, HEAR
- Send callsigns: DL1AT, HH5H, HS1TD, DS4RR, LA5ON, NA4T, ND2T
- Sending practice: pick each student in turn and have them identify the word or callsign you are sending, and having correctly identified it, send it once more and have them 'imitate' what is sent using their hand key and audio source
- Ask if there are any questions
- Tell them they are doing well
- Remind them to practice between sessions
- Give them the new letters/numbers to learn: U, C
- End the session

Week 3 Session 1

- Call each student and assemble virtual group
- Ask if there are any questions
- Review letters/numbers learned to date by having them sent, four times each, while students visualize the letters/numbers

- Send word groups: CHAT, CHAIR, CHIN, CHART, OUCH, COUCH, TOUCH, SUCH, TEACH, REACH, SUN, SON, HOLD, TOLD, SAIL, RAIL, TAIL, NAIL, OIL, SOIL, TOIL, COIL, RAIN, CAUSE, SAUCE, TOSS, TOLL, TALL, TELL, CELL, CALL
- Send callsigns: NC5A, NA2T, CU1LL, CO5NO, NU4R, CT1AC, CE1NI
- Sending practice: pick each student in turn and have them identify the word or callsign you are sending, and having correctly identified it, send it once more and have them 'imitate' what is sent using their hand key and audio source
- Ask if there are any questions
- Tell them they are doing well
- Remind them to practice between sessions
- Give them the new letters/numbers to learn: M, W, 3, 6
- End the session

Week 3 Session 2

- Call each student and assemble virtual group
- Ask if there are any questions
- Review letters/numbers learned to date by having them sent, four times each, while students visualize the letters/numbers
- Send word groups: WAIT, WALL, WELL, WILL, MALL, MILL, CHUM, MOW, MUCH, SUCH, WATER, WET, WHAT, DEW, DATE, ATOM, TOW, TOWER, WERE, WHERE, WAS, WISH, WASH, WASHER, MAT, MATT, MEL, HIM, HER, HIS, HW?
- Send callsigns: W3AA, N3AM, DM5RA, W6AM, N2AT, RW5L, ON4UN
- Sending practice: pick each student in turn and have them identify the word or callsign you are sending, and having correctly identified it, send it once more and have them 'imitate' what is sent using their hand key and audio source

- Ask if there are any questions
- Tell them they are doing well
- Remind them to practice between sessions
- Give them the new letters/numbers to learn: F, Y
- End the session

Week 4 Session 1

- Call each student and assemble virtual group
- Ask if there are any questions
- Review letters/numbers learned to date by having them sent, four times each, while students visualize the letters/numbers
- Send word groups: YOU, TOY, FOOT, TOOTH, ROOT, CUTE, NOISE, LARRY, ROY, TON, NOT, NOTE, NEAT, READ, LEAD, LATE, RATE, TEAR, STAR, RED, SAID, SAIL, RAID, RAIL, STIR, HIM, SHE, THEM, THEY, SAY, TEETH, FEET, HW?
- Send callsigns: F5IN, YO1AR, HH5H, NO3M, AA3U, S52R,
- Sending practice: pick each student in turn and have them identify the word or callsign you are sending, and having correctly identified it, send it once more and have them 'imitate' what is sent using their hand key and audio source
- Ask if there are any questions
- Tell them they are doing well
- Remind them to practice between sessions
- Give them the new letters/numbers to learn: P, G, 7, 9, /
- End the session

Week 4 Session 2

- Call each student and assemble virtual group
- Ask if there are any questions
- Review letters/numbers learned to date by having them sent, four times each, while students visualize the letters/numbers
- Send word groups: PAGE, PAPER, PEPPER, GLAD, GLARE, LARGE, LEDGE, GEORGE, GEO, CHAS, CHASE, CHANGE, PEG, PUG, PIG, PEN, PENCIL, PIPE, PIT, GAIN, GARAGE, GUARD, GAS, GUS, CHUG, YES, YET, YONDER, COY
- Send callsigns: G4AN/3, N1AR/5, K9UCA/9, W3/PY2AA, F6/N6AM
- Sending practice: pick each student in turn and have them identify the word or callsign you are sending, and having correctly identified it, send it once more and have them 'imitate' what is sent using their hand key and audio source
- Ask if there are any questions
- Tell them they are doing well
- Remind them to practice between sessions
- Give them the new letters/numbers to learn: B, V, AR
- End the session

Week 5 Session 1

- Call each student and assemble virtual group
- Ask if there are any questions
- Review letters/numbers learned to date by having them sent, four times each, while students visualize the letters/numbers

- Send word groups: VOTE, VAT, VIEW, WAVE, PAVE, SAVE, VOW, VALVE, SOLVE, VOLT, VAULT, BAD, BODY, BORE, BORN, BARN, BARNEY, BRAD, BREAD, BED, BETTER, BEST, BILL, BUILD, BUILT, BOLT, BULB, BLAME, BLEND, BLAND, BLOW
- Send callsigns: BV2AA, BA1RO, WB2AE, N6RB/4, W2/VE1AR, VE2/K2LE
- Sending practice: pick each student in turn and have them identify the word or callsign you are sending, and having correctly identified it, send it once more and have them 'imitate' what is sent using their hand key and audio source
- Ask if there are any questions
- Tell them they are doing well
- Remind them to practice between sessions
- Give them the new letters/numbers to learn: K, J, 8, 0, BT
- End the session

Week 5 Session 2

- Call each student and assemble virtual group
- Ask if there are any questions
- Review letters/numbers learned to date by having them sent, four times each, while students visualize the letters/numbers
- Send word groups: JACK, JAY, JOHN, JIM, JERRY, BACK, RACK, TACK, TECH, TACH, REACH, EACH, TEACH, HELP, HIGH, HILL, FACT, FACE, FAR, FEAR, THEN, THEIR, HIM, HER, HIS, HERS, THEM, THEY, THEIR, SWITCH, LINE, ANT, DIPOLE, VERTICAL, OHMS, HOME, AWAY, TEST, ASIA, AFRICA
- Send callsigns: K1JD, N1AR, W2TT, K2UMU, N2NW, VE3NE, VA3KP, K4BAI, N5KO

- Sending practice: pick each student in turn and have them identify the word or callsign you are sending, and having correctly identified it, send it once more and have them 'imitate' what is sent using their hand key and audio source
- Ask if there are any questions
- Tell them they are doing well
- Remind them to practice between sessions
- Give them the new letters/numbers to learn: X, Q, Z, BK,
- End the session

Week 6 Session 1

- Call each student and assemble virtual group
- Ask if there are any questions
- Review letters/numbers learned to date by having them sent, four times each, while students visualize the letters/numbers
- Send word groups: WL, UR, OK, HW?, QRX, RIG, WX, ANT, PWR, KW, NAME, MEMPHIS, NYC, SF, DALLAS, HOUSTON, NM, NJ, CA, UT, AL, AR, IL, IN, ME, MA, CT, CO, QRM, NE, SD, ND, PA, KY, FL, NC, SC, SDGO, LAX, LA, ON, SK, MB, NT, AB, QC, NB, NS, NR, RST, UK, USA, TOKYO, PARIS, LONDON, HAMBURG, SYDNEY
- Send callsigns: ZL2TT, VK4OM, JE1TRV, BA1CW, KH6LC, AL2A, AA3B
- Sending practice: pick each student in turn and have them identify the word or callsign you are sending, and having correctly identified it, send it once more and have them 'imitate' what is sent using their hand key and audio source
- Ask if there are any questions
- Tell them they are doing well

- Remind them to practice between sessions
- Give them the new letters/numbers to learn: QRZ, QRM
- End the session

Week 6 Session 2

- Call each student and assemble virtual group
- Ask if there are any questions
- Simulated CW QSO:

Using Morse Translator, send a simulated CQ, response, first exchanges

“CQ CQ CQ K6RB K6RB K6RB K”

“K6RB DE N3JT K”

“N3JT K6RB – GM TU FER CLG – UR RST 589 – HR IN SANTA CRUZ – NAME ROB – SO HW? N3JT K6RB K”

“K6RB N3JT – R R SLD CPY ROB ES TU FER RPRT – UR RST 579 – QTH MCLEAN VA – NAME JIM – BTU K6RB N3JT K”

- Sending practice: pick each student in turn and have them send a CQ; then respond to caller with RST, QTH and NAME; then copy RST, QTH and NAME from caller

Explain about using PSE RPT or ? to solicit a repeat. Keep going until each one succeeds.

- Ask if there are any questions
- Tell them they are doing well
- Remind them to practice between sessions
- Give them the new letters/numbers to learn: QRX, QRN
- End the session

Week 7 Session 1

- Call each student and assemble virtual group
- Ask if there are any questions
- Simulated CW QSO:

Using Morse Translator, send a simulated CQ, response, first exchanges

“CQ CQ CQ K2NW K2NW K2NW K”

“K2NW DE N5KO K”

“N5KO DE K2NW – GE TNX FER CALL – UR RST 589 – QTH is NYC – NAME is AL – SO HW CPY? N5KO K2NW AR”

“K2NW N5KO – R R– UR RST 579 – IN AUSTIN – NAME TOM – N5KO K”

- Sending practice: pick each student in turn and have them send a CQ; then respond to caller with RST, QTH and NAME; then copy RST, QTH and NAME from caller
- Explain about using PSE QRS and PSE RPT or ? to solicit a repeat. Keep going until each one succeeds.
- Ask if there are any questions
- Tell them they are doing well
- Remind them to practice between sessions
- Give them the new letters/numbers to learn: QRS, QSY
- End the session

Week 7 Session 2

- Call each student and assemble virtual group
- Ask if there are any questions
- Simulated CW QSO:

Using Morse Translator, send simulated second exchanges

“K6RB DE N3JT – R R – WX HR IS SUNNY TEMP IS 66 – RIG RUNS 100 W ANT IS DIPOLE – HW? BK ”

“BK – FB JIM WX HR IS RAIN TEMP IS 45; RIG IS A K3 AT 100 W INTO A VERT – BK”

“BK de N3JT – GOT IT ALL – TU FER QSO ROB CU AGN SN 73 SK K6RB N3JT CL”

- Sending practice: pick each student in turn and have them send a second response; then copy caller’s second response

Remind them about using PSE RPT or PSE QRS or ? to solicit a repeat. Keep going until each one succeeds.

- Ask if there are any questions
- Tell them they are doing well
- Remind them to practice between sessions
- Give them the new letters/numbers to learn: QTH, QRU
- End the session

Week 8 Session 1

- Call each student and assemble virtual group
- Ask if there are any questions
- Simulated CW QSO:

Using Morse Translator, send simulated CQ and first exchanges

This time, have them answer your CQ solicitation and copy your first exchange and respond with their first exchange

- Sending practice: pick each student in turn and keep going until each one succeeds.
- Ask if there are any questions
- Tell them they are doing well
- Remind them to practice between sessions
- Give them the new letters/numbers to learn: QRV, QRT
- End the session

Week 8 Session 2

- Call each student and assemble virtual group
- Ask if there are any questions
- Simulated CW QSO:

Using Morse Translator, send simulated second exchanges

This time, have them send second exchange and copy your second exchange; then they do a wrap-up exchange (e.g. “TU FER QSO – NW GG QRT – 73 CUL – SK, etc.”)

- Sending practice: pick each student in turn and keep going until each one succeeds.

- Ask if there are any questions
- Congratulate them; offer any final recommendations; invite them to sign up for Level 2
- End the session

Virtual CW Class Resources:

- Online video/audio conference tool: www.oovoo.com
- Morse Translator tool: type in words, set speeds, hear Morse:
<http://morsecode.scphillips.com/jtranslator.html>
- Learn CW Online (LCWO): online Morse training: <http://lcwo.net/>
- RufzXP: callsign copying trainer: <http://www.rufzxp.net/>
- MorseRunner: WPX contest simulator: <http://www.dxatlas.com/morserunner/>