LONG ISLAND CW CLUB

W2LCW

# GET ON THE AIR

# THE LICW CURRICULUM GUIDE

*WHAT LICW TEACHES*

VERSION 3.6

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## *REVISION HIGHLIGHTS:*

**Version 3.6** establishes Automatic Character Recognition (ACR) and Continuous Flow as complementary instructional objectives throughout the LICW curriculum.  It distinguishes the capability of automatic recognition from Time To Recognize (TTR), a recognition-latency concept and potential diagnostic indicator, rather than an educational target.

Beginner guidance emphasizes sound familiarity and the gradual emergence of ACR while BC2 and Guided Practice strengthen short-word Character Flow.  Intermediate and Advanced guidance connects ACR, Character Flow Proficiency, Instant Flow Recovery, Word Discovery, and conversational comprehension without defining progress by a particular TTR number.

The revised guide clarifies conditioned response as a learned action following recognition and reaffirms that Conversational Head Copy and Exact Copy share the same automatic, flow-based foundation and Loose Focus.  It aligns Bootcamp objectives and instructor terminology with the revised LICW Method Guide while preserving class structure, research references, and practice resources.

# *TABLE OF CONTENTS:*

**LIST OF ABBREVIATIONS: ..... 5**

**INTRODUCTION: ..... 5**

OVERCOMING FEAR: ..... 6
HUMAN PERFORMANCE IN MORSE CODE ACQUISITION: ..... 7
PRODUCTIVE PRACTICE: ..... 8

**ACADEMIC PROGRESSION: ..... 9**

**A CONTINUOUS DEVELOPMENTAL MODEL OF MORSE CODE LEARNING ..... 11**

**BEGINNERS CURRICULUM: THE PATH TO PROFICIENCY ..... 19**

BEGINNERS CAROUSEL 1: ..... 20
CODE TALKING: ..... 20
CHARACTER FAMILIARIZATION: ..... 21
SENDING: ..... 22
ZOOM AUDIO CHECKS (BC1 & BC SENDING): ..... 22
BC SENDING: ..... 23
MORSE CODE THEORY: ..... 24
BEGINNERS CAROUSEL 2: ..... 24
BC GUIDED PRACTICE/INTERMEDIATE PREP: ..... 25
BC OPEN PRACTICE: ..... 26
BEGINNERS CAROUSEL 3: PREPARING FOR ON-AIR OPERATING 26
ON-AIR SUPPORT: ..... 28
LICW QSO PROTOCOL CLASS: ..... 28
ACADEMIC FIELD TRIPS: ..... 28
THE STRAIGHT KEY CENTURY CLUB: ..... 29
PARKS ON THE AIR: ..... 29
CODE BUDDY: ..... 30
WHEN TO REPEAT ITEMS IN A QSO ..... 30
ADVERSE COPY: ..... 32
RECORDED QSO AND ADVERSE COPY CLASS: ..... 33

**TRAINING TOOLS: ..... 34**

THE LICW MORSE PRACTICE PAGE: ..... 34
MORSECODE.WORLD: ..... 35
CW MICROTOOLS ..... 35
CW SIGNALS ..... 36
*CW SIGNALS* CW SIGNALS ..... 36
CW FLOW PRACTICE TOOLS ..... 36

MORSE CODE NINJA: ..... 37
A PRINCESS OF MARS CW AUDIO PROJECT: ..... 37
MORSE WALKER: ..... 38
RUFZXP: ..... 38

**INTERMEDIATE CURRICULUM: THE PATH TO FLUENCY ..... 39**

CURRICULUM OVERVIEW: ..... 39
RECOGNITION, LANGUAGE, AND COMPREHENSION: ..... 39
FROM UNDERSTANDING TO ABILITY BY MIKE N1CC AND TOM W0FN ..... 41
EXACT COPY VERSUS CONVERSATIONAL HEAD COPY ..... 42
LISTENING FORWARD, AND WHY HEAD COPY FEELS LIKE MAGIC BY QUENTIN K7DRQ ..... 49
A FLOW-BASED PATH TO FLUENCY BY TOM W0FN ..... 53
THE FLOWING HYDRANT OF CW ..... 55
LOOSE FOCUS AND ALERT INDIFFERENCE: ..... 55
INCREASING EFFECTIVE SPEED: ..... 56
AUTOMATIC CHARACTER RECOGNITION (ACR) AND TIME TO RECOGNIZE (TTR): ..... 57
INSTANT FLOW RECOVERY (IFR): ..... 58
CHARACTER FLOW: ..... 59
CHARACTER FLOW PROFICIENCY: ..... 59
TRANSITION FROM WORD BUILDING TO WORD DISCOVERY: ..... 60
THE SPECTRUM OF FLUENCY: ..... 61
ANNOTATIVE COPY, NOTE TAKING, AND HEAD COPY: ..... 63
INTERMEDIATE SENDING: ..... 67
CONNECTING SENDING TO RECOGNITION: ..... 67
CLASS SCHEDULES: ..... 70
ESSENTIAL OPERATING SUBJECTS: ..... 70
EXACT COPY PROGRAM ..... 71

**ADVANCED CURRICULUM: THE PATH FROM FLUENCY TO MASTERY ..... 73**

CURRICULUM OVERVIEW: ..... 73
ADVANCED LEVELS: ..... 74

**OVERLEARN BOOTCAMP: ..... 76**

OVERVIEW: ..... 76
ONE UNIFIED BOOTCAMP: ..... 79
DIFFERENTIATED PRACTICE WITHIN THE COMMON PROGRAM: . 80
PROGRAM STRUCTURE AND COMMITMENT: ..... 80
READINESS AND ELIGIBILITY: ..... 81
LEARNING OBJECTIVES: ..... 82

OVERLEARN CAPSTONE EVENTS - CONSOLIDATION, FLUENCY, AND ENDURANCE: ..... 82

## *LIST OF ABBREVIATIONS:*

| | | | |
|---|---|---|---|
| ACR | Automatic Character Recognition | LICW | Long Island CW Club |
| ADV | Advanced | MPP | Morse Practice Page |
| AGN | Again | PC | Personal Computer |
| ARRL | American Radio Relay League | POTA | Parks On The Air |
| BC | Beginners Carousel | QRS | Send slower |
| BK | Break | QRQ | Send faster - High-Speed Telegraphy |
| CFP | Character Flow Proficiency | QSO | A contact |
| CQ | Calling any station | RR | Understood |
| CW | Continuous Wave - Morse Code | SKCC | Straight Key Century Club |
| DX | Long distance station | SOTA | Summits On The Air |
| FWPM | Farnsworth Words Per Minute | SST | Slow Speed contest |
| HST | High-Speed Telegraphy | TTR | Time To Recognize |
| IARU | International Amateur Radio Union | VET | Variable Effective Speed Training |
| IFR | Instant Flow Recovery | VST | Variable Speed Training |
| INT | Intermediate | WPM | Words Per Minute |
| IWR | Instant Word Recognition | WWII | World War Two |

## *INTRODUCTION:*

This document is written primarily for instructors, curriculum developers, and club leaders, though it may also be useful to students who want a deeper understanding of the LICW academic program.

Its purpose is to explain the LICW academic model, describe the curriculum structure, define key instructional terminology, and support consistency across classes, levels, and instructors.

The Curriculum Guide focuses on what LICW teaches and how the academic program is organized. The companion LICW Method Guide explains why the LICW method is structured as it is and preserves the deeper instructional philosophy, curriculum rationale, and instructional continuity framework. Across that structure, LICW relies principally on live, interactive instruction, guided practice, and real-time instructor feedback.

LICW's receiving objectives are Automatic Character Recognition (ACR) and Continuous Flow. ACR means recognizing characters from their sounds without deliberate element analysis; Flow means staying with

successive incoming material while preserving continuity and recovering from misses. ACR begins developing in the Beginners Carousel and is strengthened throughout Intermediate and Advanced instruction. Time To Recognize (TTR) describes one aspect of recognition latency and is useful diagnostically, but is not a proficiency destination. The Method Guide explains the reasoning; this Curriculum Guide shows how the objectives are taught.

LICW's academic framework draws on both historical and modern learning science. Historical works such as Ludwig Koch's[1] 1936 study and Donald Taylor's[2] 1943 Harvard thesis helped shape the club's emphasis on sound-first learning, productive practice, and the management of human performance differences. These historical principles have been modernized through Project OverLearn and refined through extensive classroom experience.

Modern research by Guediche and Fiez[3] further distinguishes perceptual fluency from comprehension, finding that short-term-memory performance predicted Morse comprehension even after differences in perceptual fluency were taken into account. LICW uses this distinction as an explanatory framework for its progression toward word discovery, conversational head copy, and direct comprehension.

In short, the **LICW Student Start Guide** explains the essentials a member needs in order to begin and progress. The **LICW Curriculum Guide** explains the structure of the academic program. The **LICW Method Guide** preserves the reasoning and principles behind the method.

## OVERCOMING FEAR:

Many Morse code students encounter a psychological barrier rooted in fear, most often the fear of being judged by others. This fear can inhibit progress by keeping students out of the growth zone, where improvement occurs only by working at the edge of one's ability.

Perfectionism often compounds the problem. Striving for flawless performance is counterproductive in learning CW. Telegraphy is not about perfection; even highly proficient operators miss characters and words.

---

[1] L, Koch, Arbeitspsychologische Untersuchung der Tatigkeit bei der Aufnahme von Morsezeichen, zugleich ein neues Anlernverfahren fur Funker, A. angew.. Psychol., 50, 1936, 1-70.
[2] Taylor, D. W. (1943). Learning Telegraphic Code. Psychological Bulletin, 40(7), 461- 487.
[3] Guediche, S., & Fiez, J. A. (2021). Comprehension of Morse code predicted by item recall from short-term memory. Journal of Speech, Language, and Hearing Research, 64(9), 3465–3475.

These misses are not failures, but normal signals of learning and part of real-world communication.

The path forward is to normalize vulnerability and recognize that mistakes are an essential part of skill acquisition. LICW seeks to foster a culture of respect, encouragement, and mutual support, creating the safe environment learners need in order to take risks, expand their limits, and grow toward fluency.

**Instructor Notes: Helping Students Overcome Fear**

- **Normalize mistakes.** Remind students that even expert operators miss characters; recovery and flow matter more than perfection.
- **Redirect self-criticism.** When a student apologizes or becomes discouraged, reframe the miss as a natural and expected part of learning.
- **Highlight progress, not perfection.** Call attention to what the student is doing well - recognizing letters more quickly, staying in the stream, or showing persistence.
- **Model vulnerability.** Share your own early struggles. This helps students understand that today's difficulties are common and temporary.
- **Promote community.** Encourage students to support one another. Hearing peers normalize challenges reduces the pressure of feeling alone in the process.

## HUMAN PERFORMANCE IN MORSE CODE ACQUISITION:

Not all students learn Morse code at the same pace, and that is expected. Differences in performance are shaped primarily by three factors: aptitude, the distribution and quality of practice, and motivation.

Historical research and modern classroom experience both show that time to proficiency varies widely. Some learners progress quickly, while others require substantially more time and support. The existence of that spread should shape both instructor expectations and curriculum design.

For instructors, the practical implications are clear: normalize differences in pace, emphasize productive practice over raw hours, reinforce flow rather than perfection, and help students understand that plateaus may occur and are not evidence of failure.

The central instructional message is that progress is rarely linear, but steady effort combined with sound practice habits leads to success. This topic is expanded in the companion LICW Method Guide.

## PRODUCTIVE PRACTICE:

Practice is more than simply putting in time; it is the process of making measurable progress toward defined objectives. That distinction separates ordinary practice from **productive practice**. To progress efficiently, students need clear goals. When the target skill is understood, it becomes easier to choose the exercises most likely to move learning forward.

Practice sessions should be built around realistic expectations and a limited number of objectives, ideally one to three skills in a given session. Sending should be included regularly and purposefully because it reinforces rhythm, timing, spacing, and the sound-motor connection that supports receiving. Practice is most effective when done in an environment free from distraction and approached with Loose Focus, since that mindset promotes more effortless copying, extends endurance, and reduces mental fatigue.

Over practice should be avoided. Fatigue undermines learning. Koch observed that an effective single practice period is about **30 minutes**, and that two such sessions per day can produce rapid progress. Many modern learners, however, benefit from shorter sessions of approximately **15 minutes** distributed across the day, which helps preserve momentum while reducing fatigue.
Rest and recovery are essential parts of the learning process. Sustainable progress requires pacing, consistency, and the avoidance of burnout. Students should understand that progress is rarely linear; periods of rapid improvement are often followed by plateaus or brief regressions. These are normal features of skill development, not signs of failure. The long-term goal is not intensity alone, but consistency supported by productive habits over time.

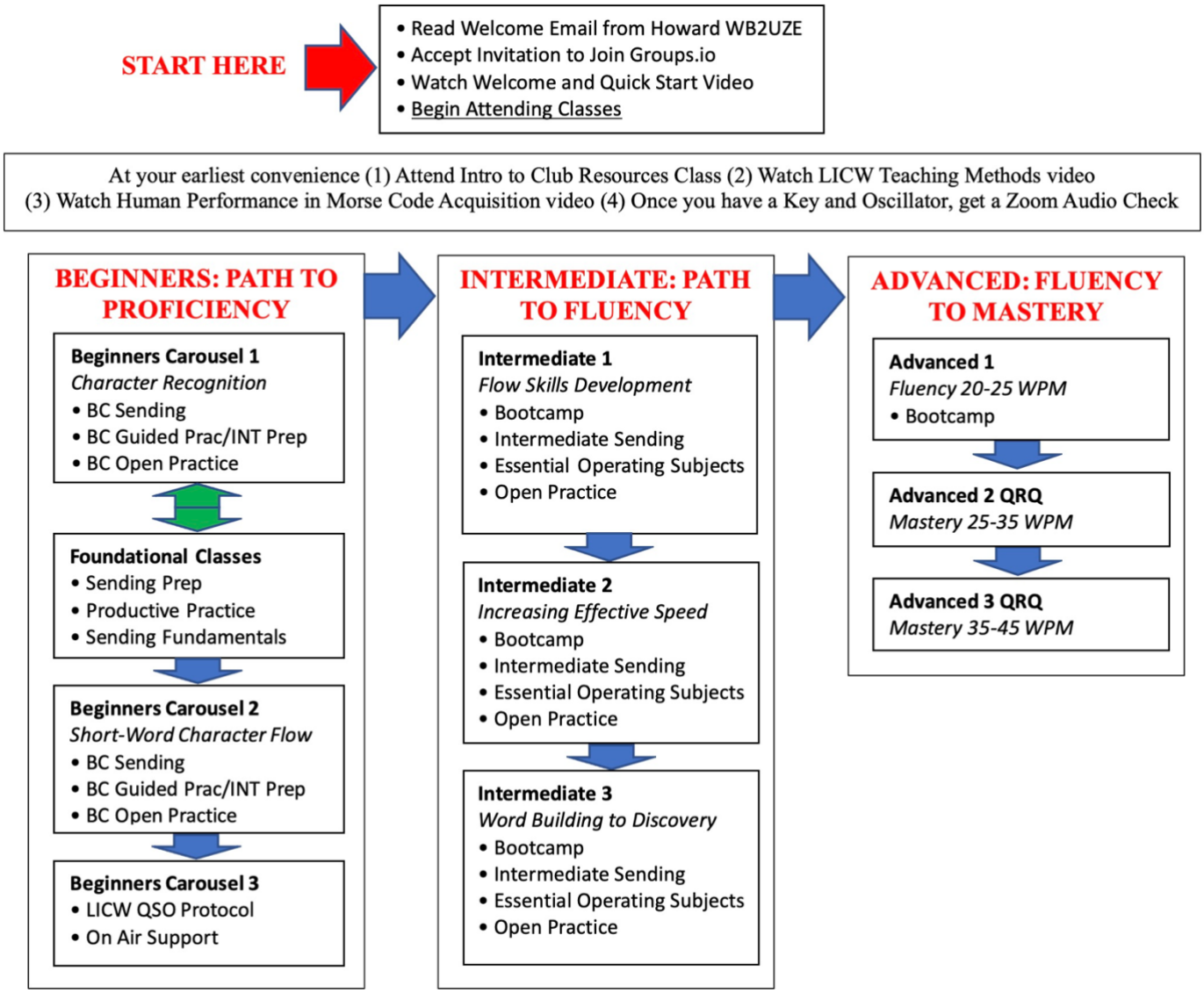
**KEY TAKEAWAY**
Productive practice is purposeful, focused, and sustainable. Students should practice toward defined objectives, generally limiting a session to one to three skills, while incorporating sending and working without unnecessary distraction. Short, distributed sessions with adequate rest are often more productive than prolonged practice. Long-term progress depends more on consistency and quality than on intensity or raw hours.

## *ACADEMIC PROGRESSION:*

The LICW academic model is structured as a single continuous progression from early sound familiarity toward Automatic Character Recognition (ACR) and foundational operating competence, then through increasingly continuous Flow to conversational fluency and, for those who wish to continue climbing, mastery.

The Beginners Carousel establishes sound-first learning habits, begins the development of ACR, builds early short-word Character Flow, and prepares students for on-air operating. The Intermediate curriculum strengthens ACR within continuous Flow, recovery, and Word Discovery as students advance along the Path to Fluency. Advanced instruction consolidates conversational fluency and extends it into resilient, increasingly lower-effort QRQ operation.

The following chart illustrates the overall academic progression as a single continuous learning path with three major developmental phases:


START HERE
• Read Welcome Email from Howard WB2UZE
• Accept Invitation to Join Groups.io
• Watch Welcome and Quick Start Video
• Begin Attending Classes
At your earliest convenience (1) Attend Intro to Club Resources Class (2) Watch LICW Teaching Methods video
(3) Watch Human Performance in Morse Code Acquisition video (4) Once you have a Key and Oscillator, get a Zoom Audio Check
BEGINNERS: PATH TO PROFICIENCY
Beginners Carousel 1
Character Recognition
• BC Sending
• BC Guided Prac/INT Prep
• BC Open Practice
Foundational Classes
• Sending Prep
• Productive Practice
• Sending Fundamentals
Beginners Carousel 2
Short-Word Character Flow
• BC Sending
• BC Guided Prac/INT Prep
• BC Open Practice
Beginners Carousel 3
• LICW QSO Protocol
• On Air Support
INTERMEDIATE: PATH TO FLUENCY
Intermediate 1
Flow Skills Development
• Bootcamp
• Intermediate Sending
• Essential Operating Subjects
• Open Practice
Intermediate 2
Increasing Effective Speed
• Bootcamp
• Intermediate Sending
• Essential Operating Subjects
• Open Practice
Intermediate 3
Word Building to Discovery
• Bootcamp
• Intermediate Sending
• Essential Operating Subjects
• Open Practice
ADVANCED: FLUENCY TO MASTERY
Advanced 1
Fluency 20-25 WPM
• Bootcamp
Advanced 2 QRQ
Mastery 25-35 WPM
Advanced 3 QRQ
Mastery 35-45 WPM

# *A CONTINUOUS DEVELOPMENTAL MODEL OF MORSE CODE LEARNING*

Within the LICW academic model, student development is best understood as a single continuous learning path marked by three major developmental phases: the Path to Proficiency, the Path to Fluency, and the Path from Fluency to Mastery.

These are not separate or competing tracks of development. Rather, they describe three major phases within a single continuous progression: the earlier climb to foundational operating competence, the longer climb to sustained conversational fluency, and the further extension of that fluency into high-speed, lower-effort mastery.

This distinction is useful academically, operationally, and instructionally. It helps instructors describe more precisely where a student is in the learning process, what kind of progress is taking place, and what goals are most appropriate at a given stage. It also helps students understand that not all progress in Morse code acquisition is of the same kind. The early goal is not yet fluent conversational copy. The next goal is conversational fluency. Beyond that, for those who wish to continue climbing, lies mastery.

**KEY TAKEAWAY**
Proficiency, fluency, and mastery are distinct developmental phases within one continuous learning path. Proficiency establishes foundational operating competence. Fluency develops continuity, recovery, Word Discovery, and conversational communication. Mastery extends that fluency into increasingly higher-speed, lower-effort, and more durable performance. Each phase prepares the student for the next.

## THE PATH TO PROFICIENCY

The first major developmental phase, the Path to Proficiency, extends from BC1 through entry into INT1.

During this phase, students learn Morse code as sound rather than as visual pattern. They complete the 44 basic characters, develop early short-word character flow, build correct sending habits, and prepare for live operating. This is the period in which the student moves from unfamiliarity to dependable use. By the time a student is ready to enter INT1, the

essential beginner task has been accomplished: the student is no longer merely learning characters, but is prepared to begin developing flow in a more continuous and demanding way.

Proficiency does not mean that Morse code has become effortless or fully conversational. It means the student can recognize, send, and use Morse code with growing confidence, even though performance may still be effortful and dependent on attention, annotation, or structured contexts.

In practical terms, proficiency may be illustrated by the ability to manage shorter, more structured operating formats such as SKCC, SOTA/POTA, and K1USN SST exchanges. These formats provide meaningful short-term milestones because they allow the student to use Morse code successfully in real operating contexts before longer conversational fluency has fully developed.

The Path to Proficiency includes the following developmental stages:

**1. Character Recognition (BC1 & BC2)**

**Objective: Establish dependable recognition of the 44 basic Morse characters as complete acoustic patterns and begin developing Automatic Character Recognition (ACR).**

This stage begins with sound-first character learning and the development of familiarity through repeated exposure, reinforcement, and deliberate practice. The emphasis is not on visual memorization, analytical reconstruction, or a prescribed recognition time, but on hearing each character as one acoustic unit. With practice, recognition becomes increasingly automatic. Sending is introduced early to reinforce sound familiarity, recall, rhythm, and motor production.

**2. Short-Word Character Flow (BC2, BC Guided Practice / Intermediate Prep)**

**Objective: Develop the ability to remain with a succession of recognized characters, process short groups fluidly, and begin forming common words and phrases.**

BC2, Guided Practice, and Intermediate Prep extend recognition into short, continuous streams. Students practice staying with arriving characters, using IFR after misses, and building ACR while preparing for INT1. Isolated-character accuracy alone does not establish continuous reception.

## 3. On-Air Readiness (BC3)

**Objective:** Prepare students to use Morse code in real operating situations.

This stage develops competence, confidence, and readiness for live use. Students practice structured exchanges, learn QSO conventions, and begin bridging classroom skill into real radio communication. The instructional objective is not merely first contact, but supported entry into meaningful and repeatable operating activity.

## PROFICIENCY THRESHOLD

A student entering INT1 may be described as proficient when the student can:

- Recognize the full basic character set as sound
- Send with reasonable rhythm, spacing, and control
- Process short words and character groups with some continuity
- Participate in short, structured exchanges with growing confidence
- Begin functioning in real operating environments without needing everything to remain slow, isolated, and fully controlled

At this point, the student has achieved foundational operating competence. The next developmental task is not simply to recognize characters more quickly. It is to strengthen ACR within increasingly continuous Flow.

## THE PATH TO FLUENCY

The second major developmental phase, the Path to Fluency, extends from INT1 through ADV1.

This is the period in which Morse code begins to change in character for the learner. What was once processed primarily as separate characters gradually becomes flowing sound, then emerging words, then increasingly meaningful language. The student moves from decoding toward flow, from flow toward word discovery, and from word discovery toward conversational head copy and natural rhythmic communication.

Fluency does not require perfect automaticity or instantaneous recognition. Rather, it is the ability to communicate effectively and naturally in Morse

code while sustaining rhythm, preserving continuity, and conveying or understanding meaning with increasing ease. In this sense, fluency develops along a spectrum. Early in this path, the student may still rely substantially on active decoding, annotation, or effortful construction. Later, comprehension becomes more intuitive, more durable, and less dependent on conscious assembly.

The Path to Fluency includes the following developmental stages:

### 1. Flow Skills Development (INT1)

**Objective:** Develop continuity in real-time copy so that students can move beyond controlled exercises and begin processing conversational code with greater ease.

INT1 marks the beginning of sustained Flow Skills Development. Students receive Morse in more realistic contexts, develop natural head sending, and cultivate Loose Focus and Instant Flow Recovery. Students may know the characters yet still struggle to remain with the stream. The focus is therefore on applying developing ACR without pausing, mentally rewinding, or turning a miss into an interruption.

### 2. Increasing Effective Speed (INT2)

**Objective:** Improve cognitive efficiency rather than raw speed.

At this stage, the instructional emphasis is on strengthening Automatic Character Recognition (ACR), Instant Flow Recovery (IFR), and Character Flow Proficiency (CFP) together. Automatic recognition reduces deliberate analysis, IFR protects continuity after a miss, and CFP sustains reception across successive characters. Shorter Time To Recognize (TTR) may accompany this development, but TTR is an indicator of recognition latency, not a skill to pursue independently or a prerequisite for Flow.

### 3. Transition from Word Building to Word Discovery (INT3)

**Objective:** Shift from deliberate, character-by-character construction toward emerging word recognition through rhythm, familiarity, and context.

This stage marks one of the most important changes in the student's experience of Morse code. Words begin to appear less as assembled products of conscious effort and more as emerging units perceived through

flow. This transition is not absolute or immediate, but it represents a major step toward conversational fluency.

### 4. Conversational Fluency (ADV1)

**Objective:** Achieve conversational head copy and sending with increasing ease, continuity, and comprehension.

ADV1 consolidates the flow, recovery, and word-discovery skills developed in Intermediate and extends them into relaxed conversational operation. At this stage, the student is increasingly able to sustain copy, follow trains of thought, and participate in longer and less structured exchanges. Morse code begins to function more fully as language and less as a decoding exercise. The emphasis is on continuity, gist, endurance, and natural conversational rhythm.

### FLUENCY THRESHOLD

A student functioning at the upper end of the Path to Fluency, especially at the ADV1 level, may be described as increasingly fluent when the student can:

- Remain in the stream during continuous copy
- Recover quickly from misses without losing synchronization
- Follow conversational material with growing head-copy ability
- Sustain longer and less structured QSOs
- Communicate with increasing naturalness rather than relying primarily on laborious character-by-character construction

In practical terms, this is the path that leads beyond short, structured exchanges and toward longer QSOs, more relaxed ragchewing, and the broader conversational use of Morse code.

At the completion of this path, the student has not merely learned to use Morse code competently, but has begun to use it conversationally. For many operators, this represents a deeply satisfying achievement in itself. For those who wish to continue climbing, however, fluency is not the end of the journey. It is the threshold of mastery.

## THE PATH FROM FLUENCY TO MASTERY

The third major developmental phase, the Path from Fluency to Mastery, extends from ADV2 through ADV3.

At this stage, the student is no longer working primarily to achieve conversational fluency, but to deepen it, stabilize it, and extend it into QRQ operation with increasing ease. The challenge is not simply more speed. It is the continued reduction of cognitive drag so that Morse code can function as a true conversational medium even under denser, faster, and more sustained conditions.

Mastery does not imply perfection. It describes a level of development in which recognition, recovery, word discovery, and comprehension have become sufficiently overlearned that higher-speed operation is increasingly manageable, natural, and enjoyable.

The Path from Fluency to Mastery includes the following developmental stages:

### 1. Entry into Mastery (ADV2)

**Objective:** Extend fluency beyond ordinary conversational pace and deepen resilience, endurance, and Word Discovery at higher speed.

ADV2 marks the transition from ordinary conversational fluency into QRQ development. At this stage, students work to preserve continuity, relaxed comprehension, and conversational rhythm as speed rises beyond ordinary ragchew range. Fluency is no longer merely maintained; it is stretched and strengthened under greater demand.

### 2. High-Speed Conversational Mastery (ADV3)

**Objective:** Sustain high-speed QRQ operation with growing confidence, ease, endurance, and increasingly effortless comprehension.

ADV3 extends the same developmental logic further. Morse increasingly functions as a conversational medium at its highest practical levels. The goal is not speed for its own sake, but the ability to remain relaxed, engaged, and communicative while operating at speeds that would otherwise overwhelm deliberate decoding.

## MASTERY THRESHOLD

A student functioning in the Path from Fluency to Mastery may be described as moving toward mastery when the student can:

- Sustain fluent copy at QRQ speeds with increasing ease
- Preserve continuity and recovery under greater speed pressure
- Retain conversational meaning at higher operating densities
- Maintain endurance and natural rhythm during extended high-speed exchanges
- Experience Morse increasingly as direct communication rather than as a decoding task

In practical terms, this is the path that leads beyond conversational fluency into increasingly effortless QRQ operation and the highest practical levels of manual CW communication.

## THE RELATIONSHIP BETWEEN PROFICIENCY, FLUENCY, AND MASTERY

The distinction between proficiency, fluency, and mastery is not merely semantic. It reflects real differences in developmental challenge.

The Path to Proficiency is the climb to foundational operating competence. The Path to Fluency is the climb from foundational competence to increasingly natural conversational communication. The Path from Fluency to Mastery is the climb from conversational fluency to increasingly higher-speed, lower-effort, and more durable performance.

Proficiency is shorter, more bounded, and easier for students to recognize as an early achievement. Fluency is longer, more cognitively demanding, and more gradual in its emergence. Mastery is narrower in audience but deeper in demand, requiring continued exposure, continued refinement, and a willingness to extend conversational ability into QRQ territory.

## A CONTINUOUS PROGRESSION

These three major phases should be understood as distinct but continuous parts of a single learning path. The Path to Proficiency prepares the student for the Path to Fluency. The Path to Fluency fulfills the deeper promise of the earlier work and, at ADV1, reaches conversational fluency.

The Path from Fluency to Mastery then extends that fluency into increasingly effortless high-speed operation.

The first phase develops sound recognition, sending control, short-word flow, and operating readiness. The second develops continuity, recovery, reduced cognitive drag, word discovery, and conversational head copy. The third extends those gains into QRQ confidence, endurance, and increasingly effortless high-speed communication.

Together they describe the full climb from early character learning to advanced Morse code development. Within the LICW academic model, naming these phases more explicitly helps preserve clarity for instructors, realism for students, and coherence for the curriculum as a whole.

# *BEGINNERS CURRICULUM: THE PATH TO PROFICIENCY*

One of the enduring contributions of Koch's 1936 report is the principle that Morse code should be learned as complete acoustic patterns rather than by visual reference to printed dots and dashes.

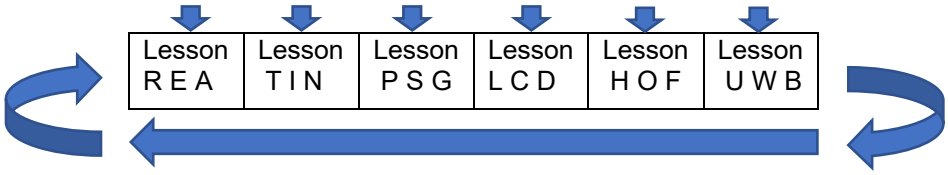
Koch taught fixed-start courses. His practical procedure began with two well-differentiated sound patterns and then expanded the character set one new character at a time. He also used a familiarity-before-identification exercise in which learners listened for a recurring acoustic pattern before being told which letter it represented. LICW preserves these sound-first principles while adapting them to a continuous-entry Carousel that has no common starting pair.

Koch also examined character speed and concluded that characters sent too slowly lose their acoustic wholeness and invite analytical counting. His practical training used approximately 12 WPM as an initial character speed. LICW follows that sound-pattern principle by beginning the Beginners Carousel at 12 WPM and then developing increasing effective speed through the Intermediate curriculum.

Koch's report does not establish a single canonical character sequence. LICW therefore treats character order as a curriculum design decision. The LICW Beginners sequence is communication-driven, giving early priority to characters useful in standard QSO protocol, callsigns, abbreviations, numbers, and prosigns so students begin encountering meaningful operating patterns while they learn the character set.

The Beginners curriculum is organized into three carousels, culminating in preparation for on-air operating. There is no fixed entry point and no reset; students may join a carousel at any time and advance when ready. The carousel structure accommodates a wide range of learning speeds and styles. Faster learners may complete a single rotation before moving on, while others may take multiple rotations to reinforce skills before progressing. This flexible structure allows students to advance at a pace that supports both confidence and competence.

## BEGINNERS CAROUSEL 1:




BC1 consists of **18 characters** taught in **six lessons**, with the broad objective of helping students learn how to learn CW using the LICW Method while developing early character recognition. The instructional emphasis is on hearing and associating CW acoustic patterns with their corresponding characters.

Training begins at a **character speed of 12 WPM** with an **effective Farnsworth speed of 8 WPM (12/8)**. Each lesson introduces **no more than three new characters**, one at a time, using LICW's sound-first character-introduction process. For each new character, the instructor first plays the sound **without revealing its identity**. Students mark a dot on paper each time they recognize the recurring acoustic pattern, reinforcing perception of the character as a **single, complete sound unit** rather than as a sequence of dits and dahs.

Only after sound familiarity begins to form is the pattern linked to its corresponding letter. Students then respond by **saying, writing, or typing** the character when they hear it. The same sequence is used for each new character introduced during the lesson.

After identification, students send the new character on a straight key or verbalize it for the instructor, and the character is integrated with material already in the curriculum stream. This live response gives the instructor useful insight into whether the student is perceiving the character as a unified acoustic pattern or analytically reconstructing it element by element.

## CODE TALKING:

Code Talking is a simple and effective way to maintain immersion in Morse code throughout the day. By verbalizing characters, students can reinforce sound patterns without the need for a key, oscillator, or other equipment. The method was introduced to LICW by Chris Rutkowski[4], NW6V.

The method uses three spoken sounds: **"di," "DAH," and "dit."**

[4] Rutkowski, C (2023). The CW Way of Life.

- **“di”** and **“DAH”** correspond directly to the character elements.
- The **final dot** in a character is spoken as **“dit.”**
- Capitalized **“DAH”** indicates emphasis.

For example:

- **R -> “di-DAH-dit”**
- **E -> “dit”**
- **A -> “di-DAH”**

Because Code Talking reflects the acoustic rhythm of actual Morse code, it integrates naturally into early learning. Within BC1 it is used after a sound has been introduced, as a **bridge** to actual sending and receiving and as a way for the instructor to hear how the student is perceiving the character. It is not a substitute for sound-first introduction or live receiving practice.

One of its chief strengths is portability. Students can use it informally throughout the day by verbalizing letters from signs, license plates, or other common visual prompts as though they were being sent in code. Even brief periods of practice can reinforce character recognition, strengthen awareness of rhythm and spacing, and support the development of more automatic recognition habits. Over time, this kind of immersion helps Morse code feel increasingly familiar and natural.

## CHARACTER FAMILIARIZATION:

Character sound familiarity is the foundation of Automatic Character Recognition (ACR). A character’s identity can be taught, but effortless familiarity with its acoustic pattern must be built. LICW therefore prioritizes familiarity first, for as long as necessary, while gradually developing dependable recognition in the incoming stream. Repeated exposure, sending, receiving, and deliberate practice move recognition toward automaticity without imposing an artificial recognition-time threshold. BC1 introduces unfamiliar characters **one at a time** and no more than three during a one-hour lesson. The sequence is deliberate: hear the unidentified sound, recognize its recurrence, attach the letter identity, send or Code Talk the character for the instructor, and then integrate it with previously learned material. This keeps the perceptual target clear and allows the instructor to reinforce **single acoustic patterns** rather than analytical reconstruction of dits and dahs.

The instructor then leads character familiarization exercises that mix the newly introduced sound with previously learned material. Outside class, students continue familiarity practice until each new sound becomes dependable. As familiarity strengthens, exercises increasingly emphasize ACR and brief, manageable Character Flow rather than a race for a lower TTR number.

A relaxed state of mind, combined with **loose focus**, supports this process. That mindset helps new characters settle more easily, reduces mental fatigue, and promotes longer periods of effortless copy.

**Instructional note:** In a student's first BC1 lesson, the primary objective is familiarity with the newly introduced characters. While the student may remain for the second half of the class, doing so may be counterproductive if that portion reviews characters not yet learned.

**KEY TAKEAWAY A character identity can be taught; sound familiarity and automaticity must be built. LICW introduces complete acoustic patterns, one at a time and no more than three per lesson. The objective is developing ACR and the ability to remain in Flow, not achieving instantaneous recognition or a particular latency score.**

## SENDING:

Sending is not merely a mechanical skill; it is a foundational component of Morse code development across the full continuous learning path from proficiency through fluency to mastery. Disciplined sending develops rhythm, spacing, and tempo, which in turn strengthen perception on the receiving side.

Sending is integrated across all stages of instruction. Sending classes are structured to align with the enabling objectives at each stage of the curriculum, reinforcing the progression from early character learning to fluent communication.

## ZOOM AUDIO CHECKS (BC1 & BC SENDING):

The default Zoom audio configuration does not reliably pass a student's CW sidetone. Troubleshooting this during class disrupts instruction and reduces learning time for everyone. For that reason, Zoom Audio Checks

are used as a readiness step before BC1 and BC Sending classes whenever feasible. Their purpose is to verify that sidetone, keyer input, microphone routing, and audio levels are functioning properly before instruction begins.

The academic principle is straightforward: prevent avoidable technical friction outside class whenever possible so that class time can remain focused on learning Morse code rather than solving setup problems.

**BC SENDING:**

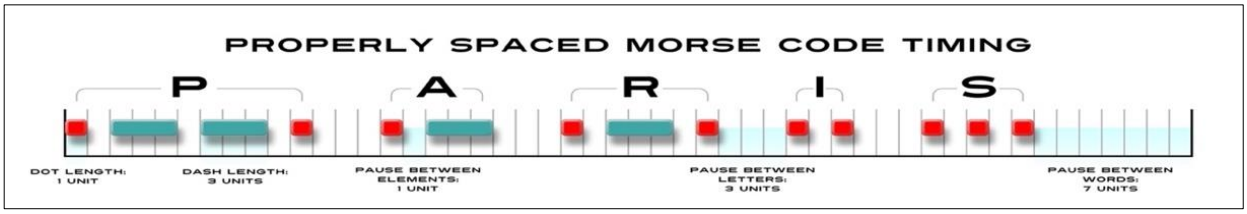
BC Sending supports students from the beginning of their CW journey through completion of the full 44-character set. Instruction begins with key adjustment and proper hand placement in order to promote comfort, control, and endurance. The straight key is the preferred instructional starting point because its simple ON/OFF action mirrors the signal structure of Morse code and reinforces manual awareness of rhythm and spacing. This is a starting recommendation, not a permanent limitation; paddles, keyers, bugs, and other sending methods become appropriate as the student develops a stable sound and timing foundation.

A central feature of BC Sending is practice against a standard so that errors are not repeated and reinforced. The LICW Morse Practice Page (MPP) is used for this purpose, with instructors guiding students through a simple progression: **hear a letter** → **say a letter** → **send a letter**. Real-time feedback helps students form dits and dahs cleanly, maintain correct spacing, and develop consistent rhythm. Instructors provide continual feedback on element and character formation so that what students send matches what they hear, strengthening the sound-symbol-motor connection that supports both sending and receiving.

As students gain consistency and complete the character set, the emphasis shifts naturally from isolated characters to smooth, rhythmic sending of words and short phrases at 12 WPM. The goal is to build confidence, pacing, and recovery so that sending begins to feel conversational rather than mechanical. BC Sending therefore serves as both a foundation and a bridge - establishing correct habits early while preparing students for the flow-based demands of the Intermediate curriculum.

## MORSE CODE THEORY:

The following graphic designed by Michael Maynard[5] K4ICY illustrates properly spaced Morse code timing:




The Morse timing standard codified by the **ITU** and recommended by both **ARRL** and **LICW** is as follows:

- A **dot** is one unit.
- A **dash** is three units.
- One unit separates each element within a character.
- Three units separate each character within a word.
- Seven units separate each word.

Correct spacing is one of the core requirements of intelligible CW. When characters or words are run together, copy can quickly become ambiguous or meaningless. For that reason, spacing should be treated not as a secondary detail, but as a central part of good sending practice. As instructor John W2JSJ often says, **"send the spaces."**

## BEGINNERS CAROUSEL 2:

| Lesson K M Y | Lesson 5 9 , | Lesson Q X V | Lesson 7 3 ? | Lesson AR SK BT | Lesson 1 6 . | Lesson Z J / | Lesson 2 8 BK | Lesson 4 0 |
|---|---|---|---|---|---|---|---|---|
| Review + BC1 | Review + BC1 | Review + BC1 | Review + BC1 | Review + BC1 | Review + BC1 | Review + BC1 | Review + BC1 | Review + BC1 |

BC2 expands the character set by introducing **26 additional characters** across **nine lessons**, including numbers, prosigns, and **BK**, bringing the total learned to **44 characters**. The broad objective of BC2 is to help students develop productive practice habits while building short-word character flow.

[5] Maynard, M. A., 2022. *Home – K4ICY* - properly spaced Morse code timing. [online] Available at: < http://www.k4icy.com/cw.html > [Accessed 4 August 2022].

Character speed remains at **12 WPM**, while effective speed increases to **10 FWPM (12/10)**. BC2 uses a more direct character-introduction process because students have already learned the sound-first habit in BC1. New characters may be identified when introduced, while instructors continue to reinforce whole-pattern perception and discourage analytical dit-and-dah reconstruction. This is an LICW curriculum decision for the later beginner stage rather than a universal claim about Koch's procedure.

New characters introduced in BC2, together with the 18 carried forward from BC1, allow students to begin receiving and sending common QSO words and phrases. This is a transition from isolated recognition toward Character Flow, not a claim that all characters must already be recognized automatically under every condition.

## BC GUIDED PRACTICE/INTERMEDIATE PREP:

BC Guided Practice / Intermediate Prep classes are held immediately after each BC2 class, and both BC1 and BC2 students are encouraged to attend. These classes provide real-time instructor feedback, peer encouragement, and collaborative learning, all of which help reinforce the skills developed in the Beginners Carousel and accelerate student progress.

The first half of each class is devoted to reinforcing the day's BC lesson through structured repetition, with emphasis on sound familiarity and character recognition.

The second half transitions to Intermediate Preparation, emphasizing multi-character Flow exercises of two to four letters that expand comfort zones, strengthen continuity, and develop short-word Character Flow Proficiency (CFP). Students are encouraged to remain with arriving characters, release missed material through IFR, and avoid mentally reconstructing earlier sounds while new material is arriving.

The Intermediate Preparation portion should resemble an **INT1 class** as closely as possible. Its purpose is to acclimate students to the structure, pace, and interactive environment they will encounter as they advance.

## Attendance Expectations

In the later part of **BC2**, attendance at **BC Guided Practice / Intermediate Prep** is no longer merely recommended but expected. Students do not need to attend the session immediately following their BC2 lesson; however, participation in at least one such session per week is expected during this phase.

## BC OPEN PRACTICE:

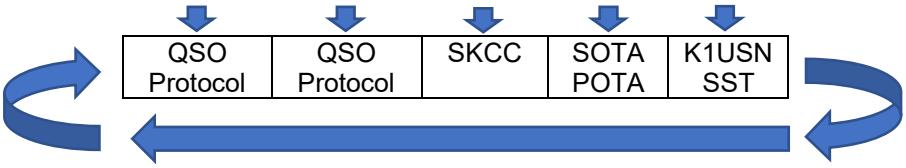
BC Open Practice sessions are held each weekday and are open to both BC1 and BC2 students. Unlike Guided Practice, which is instructor-led and aligned with the curriculum, Open Practice is student-led. This gives participants the freedom to set the pace, choose the focus, and experiment with different approaches.

The atmosphere is intentionally relaxed and social, providing a low-pressure environment in which students can apply skills outside the formal classroom setting. Although these sessions have no required structure, many groups choose to model them after Guided Practice by using simple exchanges, QSO-style interactions, and informal sending drills.

Open Practice also provides an important opportunity for peer connection. Students often share tips, compare experiences, and work through difficulties together in a collaborative spirit. This peer-to-peer environment helps reinforce learning, build confidence, and normalize the challenges of early Morse code acquisition.

Guided Practice and Open Practice are most effective when used together. Guided Practice reinforces class skills through structure and instructor support, while Open Practice provides a relaxed setting for experimentation, repetition, and peer learning. Students who participate in both typically progress more quickly, build greater confidence, and enjoy the process more fully.

## BEGINNERS CAROUSEL 3: PREPARING FOR ON-AIR OPERATING



BC3 is the culminating stage of the Beginners Carousel curriculum. It consists of five preparatory lessons designed to build the competence, confidence, and readiness required for real-world on-air operating.

Like BC1 and BC2, BC3 has no fixed entry point and no reset; students may join at any time and advance when ready. Students do not need to wait until they have completed BC2 to begin BC3. They are encouraged to join as soon as they feel ready to begin preparing for live operating.

Each lesson begins with a short briefing, followed by guided, interactive practice of a specific exchange type:

- **LICW QSO Protocol** (Lesson 1)
- **LICW QSO Protocol** (Lesson 2)
- **SKCC**
- **SOTA/POTA** (Summits on the Air / Parks on the Air)
- **K1USN SST** (Slow Speed Contest)

**Our Goal: Prepare Students to Get on the Air**

The ultimate goal of the Beginners Carousel curriculum is to prepare students to get on the air - and to succeed when they do. A first on-air QSO is a meaningful milestone and should be celebrated, but it is also deeply personal. On-air activity is encouraged, but never required. Students may begin operating whenever they feel ready, and there is no expectation to “go live” by a certain time or in a certain way.

When students do begin operating, on-air experience accelerates learning through real-world exposure. Operating in live conditions helps students learn to:

- Accept missed characters without losing focus
- Build confidence through repeated experience
- Adapt to real variables such as band conditions, different fists and key types, and changing speeds

On-air operating is rewarding. It connects students to radio history, develops adaptability, and validates hard-earned skills. Instructors should encourage on-air activity and support students whenever natural opportunities arise.

## ON-AIR SUPPORT:

LICW provides structured on-air support to help students bridge the gap between classroom learning and live operating. The **K1USN SST (Slow Speed Contest)** class, held on Sundays, offers a relaxed environment that is especially well suited to early QSOs.

## LICW QSO PROTOCOL CLASS:

LICW developed its **QSO Protocol Class** to teach the proper conduct of CW QSOs outside tightly scripted contest-style exchanges. Its purpose is to help students understand the structure, rhythm, and conventions of ordinary on-air communication.

QSOs may be:

- **Short and functional**, exchanging only essential information
- **Longer rag chews**, involving friendly, open-ended conversation

The QSO protocol is deeply rooted in operating tradition. From calling or answering a CQ to closing a contact properly and cordially, this class helps students sound more natural, confident, and experienced on the air.

Once students become familiar with QSO protocol, they are encouraged to attend **Recorded QSO Copy Class** with Bob, WO6W, on Thursdays. These sessions use real recorded QSOs to sharpen the ability to understand varied fists, authentic pacing, and real-world radio conditions.

## ACADEMIC FIELD TRIPS:

The transition from the Beginners Carousel to **Intermediate 1** can feel intimidating to some students. To reduce that anxiety, BC instructors are encouraged to arrange occasional informal visits to an **INT1** class.

The purpose of these visits is to make the next step feel familiar, welcoming, and achievable. They are not evaluative and should not be presented as a test. Rather, they give students an opportunity to observe what INT1 is actually like, participate if they wish, and discover that the class is often less intimidating - and more enjoyable - than they had imagined.

## THE STRAIGHT KEY CENTURY CLUB:

The **Straight Key Century Club (SKCC)** is dedicated to promoting and preserving the art of mechanical-key CW operation, including **straight keys, side-swipers (cooties), and bugs**.

SKCC membership is free, and LICW encourages students to join and obtain an SKCC number. SKCC also sponsors monthly and special operating events that are especially well suited to developing CW operators. LICW and SKCC collaborate on initiatives designed to help students get on the air - and remain active there - with their mechanical keys.

LICW also hosts an **SKCC assistance class** to provide an overview of SKCC and to answer questions from students who are interested in participating.

## PARKS ON THE AIR:

**Parks on the Air (POTA)** is an amateur radio operating program that encourages portable operation from parks, public lands, and other designated entities. POTA provides an accessible and structured on-air environment where operators may participate either as activators operating from a park, or as hunters making contact with those activators.

POTA is especially well suited to developing CW operators because the exchanges are brief, predictable, and repetitive. This allows students to connect their LICW training to real on-air operation in a manageable and confidence-building format. POTA contacts help students practice listening, sending, exchange recognition, recovery, and operating rhythm without requiring a long conversational QSO.

LICW and POTA collaborate on initiatives designed to help students get on the air - and remain active there. LICW encourages students to become familiar with POTA as one possible pathway to on-air activity. Participation is encouraged, but never required. The goal is to prepare students to operate when they are ready and to provide practical gateways into real CW use.

A POTA assistance class is being developed to provide an overview of POTA and to help students understand portable operating, the

activator/hunter exchange, spotting, logging, operating etiquette, and the practical steps involved in making successful CW contacts.

## CODE BUDDY:

Jay NK2Y administers the **KN6EY Memorial Code Buddy Program**. Students interested in participating can find program information in the club Dropbox, and a signup form is available through the **Club Resources** section of the class schedules. Questions about the program should be directed to Jay.

The Code Buddy model is strongly encouraged because practice with another person adds motivation, accountability, and mutual support, all of which can meaningfully accelerate progress. Code Buddy practice may take place on Zoom, VBand, or on the air, depending on student goals and equipment.

### Where to Find a Code Buddy

Beginners Carousel classes and practice sessions - both Guided and Open - are often effective places to meet compatible practice partners. Students are encouraged to look for someone whose goals, schedule, and level of commitment align with their own so that a consistent and productive practice routine can be established.

A good Code Buddy relationship can help students remain engaged, work through plateaus, and make Morse code learning more enjoyable. Over time, it can become one of the most valuable support structures in the learning process.

## WHEN TO REPEAT ITEMS IN A QSO

Repeating is not wasted time. It is one of the main ways to prevent logging errors and keep a QSO moving smoothly, especially in weak conditions, with QRM/QRN, or when the other operator is still building confidence.

The core principle is simple: **repeat what is log-critical, and repeat only as much as needed to confirm copy.** Do not repeat everything by default.

## WHAT TO REPEAT

1. **Callsigns**
   Early in the QSO, send both callsigns. If conditions are poor, repeat your own call. Near the end, repeat both calls again to help ensure both logs are correct.
2. **Exchange items**
   Repeat items the other station is likely recording: RST, name, QTH, state/province, or any required exchange. These are the items most often copied incorrectly, especially in weak or changing conditions.
3. **Critical words in a ragchew**
   Repeat words that carry the main meaning: names, places, rig or antenna details, travel plans, health context, or the main point being made. Difficult or unusual words may be repeated once or twice if needed to avoid misunderstanding.

**Practical rule:** if an item is important to the meaning or likely to be logged, it is worth repeating.

## WHEN TO REPEAT

Repeat when needed, especially:

- When the other station asks for a fill
- When QSB, QRM, QRN, or flutter may have caused partial copy
- When sending numbers such as serials, grids, ages, years, or zones
- When information is easy to miscopy, such as similar callsigns or unfamiliar place names
- When conditions or operator skill level suggest an important item may have been missed

A good operator assesses the other station's skill level early from sending quality, pacing, and requests for fills. That should guide how simple or complex your text needs to be. With newer operators, shorter sentences, familiar words, and selective repetition of key items are often best.

**Practical rule:** if you are unsure an item was copied correctly, repeat that item only, not the whole paragraph.

## BUSTED CALL: WHAT IT MEANS, AND HOW TO SAVE IT

A busted call is a callsign copied incorrectly during the QSO or later in the log. One station believes it worked the correct operator but records the wrong or incomplete callsign.

Busted calls are common and usually result from weak signals, fading, interference, flutter, unusual fists, timing problems, or incomplete copy. They are usually easy to correct.

When a station has only part of your call, repeating the full call over and over is often ineffective. A better method is:

1. Send the full call once
2. Send only the missing part several times
3. Send the full call once more for confirmation

Example: **WB2UZE UZE UZE UZE WB2UZE BK**

If only one character is missing, isolate and repeat just that character:
**WB2UZE E E E E E WB2UZE BK**

This works because it fills the gap directly instead of forcing the other station to re-copy what was already understood.

## ADVERSE COPY:

Adverse copy is the ability to copy Morse code accurately under real-world, imperfect conditions. On the air, signals are rarely as clean as the computer-generated practice many students begin with. Atmospheric noise, QRM, QSB, multipath distortion, frequency drift, chirp, buzzing, and a wide variety of sending styles - including fists with “swing” - are all part of normal operating conditions.

As Howard, WB2UZE, often reminds us, adverse signals are not to be tuned past. They represent opportunity rather than inconvenience - the kind of challenge that skilled telegraphers learn to value. Operators who develop comfort with adverse copy significantly expand their practical operating capability.

Adverse copy skills allow operators to:

- Copy weaker signals among stronger ones
- Maintain comprehension through fading and interference

- Understand fists that are rhythmic but imperfect
- Operate more effectively in crowded contest or DX environments

By training under more demanding listening conditions, operators build resilience, confidence, and versatility - qualities essential to proficient CW operation. In practical terms, when an operator can copy difficult signals, ordinary signals become far easier.

**RECORDED QSO AND ADVERSE COPY CLASS:**

In this class, students listen to and decode a variety of real on-air QSOs drawn from authentic operating conditions. Each recording is reviewed and discussed in order to highlight differences in fist, rhythm, spacing, pacing, and operator style. This gives students direct exposure to signal environments that differ significantly from idealized computer-generated practice, including **QSB, QRM, noise, and other real-world variables**.

A dedicated portion of the class focuses on **adverse copy** - the ability to maintain comprehension under imperfect or challenging conditions. Through guided exercises and progressive exposure, students learn to cope with fading, interference, unusual fists, and variable sending quality without losing continuity.

By working with real recordings rather than idealized audio, students develop greater resilience, confidence, and adaptability. For that reason, this class serves as an important complement to structured Morse training and helps prepare students for authentic on-air operating.

# *TRAINING TOOLS:*

LICW recommends selected training tools for specific instructional and practice purposes across the curriculum. These resources are chosen because particular features can reinforce LICW academic objectives, support productive practice, improve accessibility, and help students develop progressively from early recognition and operating competence through fluency and, for those who continue climbing, mastery.

Tool use is always subordinate to the LICW Method. Recommendation of a resource does not mean that every feature of that resource represents an LICW learning method. Practice tools should reinforce sound-first auditory learning and live instruction, not replace initial character teaching, real-time instructor feedback, or listening with visual, mnemonic, transcript, or decoder-based shortcuts.

## THE LICW MORSE PRACTICE PAGE:

The *LICW Morse Practice Page* (MPP) is the club's primary web-based practice platform. It is cross-platform and accessible on PC, Mac, tablet, and smartphone. Designed and developed by Randy KN4YRM, and continually expanded by Tom AB5TN, the MPP provides a flexible and accessible environment for Morse code practice across all levels of the LICW curriculum.

Exercises and configurations are aligned with the full academic program, from beginner through advanced levels, and are updated as the curriculum evolves. This allows students to work with targeted material that supports their current stage of learning and reinforces the skills most relevant to their next step.

In the Beginners Carousel, the MPP is especially useful for precise, standardized code generation during instructor-led familiarization and for independent reinforcement after characters have been introduced in class. Beginning with BC Guided Practice / Intermediate Prep and continuing through Intermediate and Advanced instruction, students need increasing exposure to natural human sending. At those stages, MPP is used primarily for targeted drills, demonstrations, and independent practice rather than as a routine substitute for live sending.

## Morse Practice Page Accessibility

The MPP has been optimized for screen-reader compatibility so that visually impaired users can navigate and operate the platform effectively. It also includes functions that support hearing-impaired users, including integration with the LICW haptic feedback device, allowing Morse code to be experienced through vibration as an alternative or supplement to audio.

These accessibility features reflect LICW's commitment to making high-quality Morse training available to all students, regardless of sensory limitation.

## MORSECODE.WORLD:

*MorseCode.World* is a free, web-based, cross-platform resource developed and maintained by Dr. Stephen C. Phillips. It provides a broad collection of Morse code tools, references, and training resources that can supplement LICW instruction and self-directed practice. The site is accessible on PC, Mac, tablet, and smartphone, supports screen readers, and can also be downloaded or installed for offline use.

The site is organized around both **International Morse Code and American ("Railroad") Morse**, making it useful for beginners, developing operators, and experienced users seeking additional practice or reference material. Its offerings include a well-known translator, flexible training tools, a keyer and sounder, decoder experiments, timing references, and historical material. LICW-aligned exercises are also available through the platform.

Within the LICW academic model, selected MorseCode.World features serve as valuable supplemental resources for practice, experimentation, and technical reference. Its translator, decoder experiments, and other visual or analytical features are not part of LICW's character-learning pathway and should not replace direct auditory practice or live instruction.

## CW MICROTOOLS

*CW Microtools* is a lightweight practice resource developed by Quentin K7DRQ, LICW's Chief Instructor. It is designed to support sending practice and early QSO preparation by helping students generate usable practice material that matches their current level of character knowledge.

The toolset can be used to generate words and sentences for sending practice when a student knows only a limited subset of Morse characters. It can also generate complete QSO exchange scripts using the student's callsign and member number for LICW, SKCC, SST, and SOTA/POTA exchanges.

## CW SIGNALS

### *CW SIGNALS* CW SIGNALS

*CW Signals* is a web-based resource developed and maintained by LICW instructor Todd Mitchell, N0IP. It offers a **flashcard trainer** as well as **structured courses,** including LICW BC1 and BC2 (to supplement, not replace, classroom instruction).

Running strictly in the browser, cwsignals.com does not send any student information to the server (or anywhere else) and is fully COPPA-compliant. The website is built for accessibility across all screen sizes. Screen-reader support continues to improve. Bug reports are appreciated at n0ip@cwsignals.com.

The flashcard trainer uses a heat-based spaced repetition system, the first of its kind in CW instruction. The trainer also provides customized sending drills that focus on the student's most challenging characters.

An Instant Character Recognition course is also available for students at every level. It offers an overspeed drill that automatically increases speed as you gain proficiency. The purpose of this course is to gain automaticity at your normal operating speed.

A "Focused Pairs" tool helps with easily confused pairs of characters, e.g. H/5. When consistent confusion is detected in flashcard drills, these pairs are added automatically. The student can also add pairs manually.

New features are in the works, including a lexicon of prosigns, Q-signals, and abbreviations derived from primary sources spanning more than a century.

## CW FLOW PRACTICE TOOLS

*CW Flow Practice Tools* is a web-based, cross-platform practice resource developed by LICW instructor Duane WA7PGE. It is designed to support

students as they progress from recognition toward fluency and, for more advanced students, toward mastery by providing configurable exercises that emphasize flow, continuity, and comprehension.

The toolset includes word- and phrase-based exercises that support recognition, word building, word discovery, and **Instant Flow Recovery (IFR)**. It also includes CW eBooks and a callsign trainer. Each tool can be configured by the user so that practice difficulty can be matched to current skill level and instructional need.

Within the LICW academic model, CW Flow Practice Tools provides targeted support for the transition from isolated recognition to sustained character flow, emerging conversational fluency, and, for more advanced students, the extension of that fluency into mastery.

## MORSE CODE NINJA:

*Morse Code Ninja*, developed by Kurt AD0WE, is a comprehensive external resource for CW training and practice. It includes a wide range of materials, including software, interactive online training, on-air practice resources, hardware recommendations, books, and instructional guidance.

LICW collaborates with Morse Code Ninja on several initiatives designed to help students learn Morse code more efficiently and improve capability through structured, high-quality practice across all three major developmental phases of the LICW learning path.

All Ninja lessons are closed-captioned, reflecting a shared commitment to accessibility and helping ensure that students with disabilities have full access to the training materials. Within the LICW academic model, Morse Code Ninja serves as a valuable supplemental resource for structured practice, curriculum-aligned reinforcement, and accessible independent study across all three major developmental phases of the LICW learning path.

## A PRINCESS OF MARS CW AUDIO PROJECT:

Wayne W5WLG has converted Edgar Rice Burroughs' *A Princess of Mars* into a chapter-based CW audio library for self-directed listening practice. The files are organized by chapter, typically run 10–20 minutes each, and are available in 2 WPM increments from 16 to 28 WPM. This

collection is especially useful for INT2, INT3, and ADV1 students working to improve flow, endurance, recovery, and sustained copy through longer-form, engaging content.

**MORSE WALKER:**

Morse Walker is a web-based CW operating simulator developed by Henry W6NYC. It allows students to practice realistic CW exchanges, including POTA and contest-style operating, in a controlled environment before taking those skills on the air.

Within the LICW academic model, Morse Walker serves as a bridge between classroom instruction and live operating. It helps students build familiarity with the mechanics and flow of an exchange so that, when they Get On The Air, more of their attention can remain available for listening, comprehension, and communication.

**RUFZXP:**

RufzXP is a callsign-reception training program designed to develop rapid and accurate recognition of amateur radio callsigns. It presents callsigns in Morse code and adjusts difficulty as performance improves, making it useful for strengthening callsign recognition, Short-Term Retention, and accurate copy under increasing time pressure. Within the LICW academic model, RufzXP is best used as a focused Exact Copy and operating-skills tool rather than as a general Morse-learning program. It can be particularly valuable for students preparing for POTA, contesting, DXing, and other operating situations in which a callsign must be received correctly the first time.

# *INTERMEDIATE CURRICULUM: THE PATH TO FLUENCY*

## CURRICULUM OVERVIEW:

The Intermediate curriculum occupies the central phase of the LICW academic program. It bridges the gap between foundational operating competence and conversational Morse fluency. At this stage, students begin to process Morse code less as isolated characters and more as flowing language. The curriculum emphasizes continuity, resilience, and increasingly intuitive recognition, helping students experience CW more as communication and less as a decoding exercise.

## RECOGNITION, LANGUAGE, AND COMPREHENSION:

At the Intermediate level, three related aspects of Morse reception become increasingly important:

**Perceptual Fluency:** The ability to accurately recognize and transcribe incoming Morse as it arrives. Perceptual fluency answers the basic question: *What did I hear?* An operator may become highly proficient at this task without developing an equivalent ability to understand an unfolding message directly.

**Lexical-Semantic Integration**: The interaction between incoming Morse and the operator's existing language knowledge, including familiar words, vocabulary, meanings, and language patterns. Where this integration is stronger, incoming patterns can contribute more readily to words and meaning rather than being treated only as separate characters to be retained and assembled. Context from the unfolding communication can further support interpretation.

**Comprehension:** The ability to understand the meaning of an unfolding Morse communication. Comprehension answers a different question: *What does the message mean?* It does not require perfect recognition or verbatim recall of every character or word.

These are related and interacting processes, not rigid stages that occur one after another. Research by Guediche and Fiez (2021) found that perceptual fluency and comprehension of meaningful Morse are

distinguishable abilities, and that short-term-memory performance predicted comprehension even after differences in perceptual fluency were taken into account.

Within the LICW curriculum, the Intermediate phase therefore develops not only faster and more reliable recognition, but the ability to remain with the continuing sound stream long enough for words, context, and meaning to emerge.

The companion **LICW Method Guide** develops these relationships more fully and presents a simplified conceptual model of how perceptual fluency, stored language knowledge, short-term memory, and comprehension interact during Morse reception.

Students typically enter Intermediate 1 proficient at 12 WPM and with early operating readiness developed through BC3. They arrive having completed the Path to Proficiency, with a working character set, basic sending ability, and early operating readiness. The task of the Intermediate curriculum is different. It is not primarily to teach the code, but to change how the student experiences the code in real time.

The Intermediate curriculum consists of three progressive levels, each building systematically on the habits, skills, and flow developed in the previous stage. Within the LICW academic model, Intermediate is the phase in which recognition begins to yield to continuity, recovery, word discovery, and emerging conversational fluency. Although ADV1 serves as the culminating stage of the Path to Fluency, the Intermediate curriculum performs most of the developmental work that makes that outcome possible.

**KEY TAKEAWAY**
Accurate transcription and direct comprehension are related, but they are not the same ability. Intermediate training develops both reliable recognition and the ability to remain with the continuing sound stream long enough for words, context, and meaning to emerge.

## FROM UNDERSTANDING TO ABILITY BY MIKE N1CC AND TOM W0FN

An easy mistake in learning Morse code is treating it mainly as an academic exercise.

Academic understanding is valuable. It explains why characters should be learned as distinct sound patterns, how conscious decoding creates a cognitive bottleneck, why maintaining flow and recovering from missed content are essential, and how practice should be structured. Yet a student may understand automaticity, Time to Recognize (TTR), Instant Flow Recovery (IFR), and sound-first learning - and still freeze during a continuous stream of CW.

***Understanding the principles of CW fluency does not produce the skill.***

The missing ingredient is rarely another lecture or explanation. It is exposure - real-time practice through on-air QSOs, or ragchewing with a practice partner in a Zoom room.

- **Instructions** set the compass direction
- **Practice** builds familiarity
- **Repetition** rewires conscious effort into subconscious pattern recognition

Motor and perceptual skills are forged in neural pathways through volume and friction, not intellect. You cannot think your way into automatic reflexes; you train them into existence.

### Theory vs. Reflex

- **Intellectual Insight:** Clarifies *why* flow-first recognition matters, helping students abandon bad habits like counting dits and dahs or relying on lookup tables.
- **Practical Experience:** Converts clunky, conscious, high-energy translation into effortless reflex through cumulative hours of live sound exposure.

- **Neuro-Perceptual Definition (Ideal for CW/Skill Acquisition):** The shift of an action from deliberate, conscious processing to reflex, where repetitive exposure enables the subconscious brain to map input to output instantaneously.

**Practice is not an exam to test your recognition skills; it is the construction site where the skill is physically built.**

**KEY TAKEAWAY Understanding Morse is not the same as using it fluently. Instruction can explain sound-first learning, ACR, Continuous Flow, IFR, CFP, and appropriate listening posture. The underlying automaticity develops through meaningful, repeated listening, sending, guided practice, and on-air use.**

## EXACT COPY VERSUS CONVERSATIONAL HEAD COPY

*Changing The Listening Posture*

One of the most important transitions in the Intermediate curriculum is not simply learning to copy faster. It is learning that different receiving tasks require different mental postures.

Morse code is used for many purposes. Sometimes the objective is exact transcription. At other times the objective is conversational comprehension. Those are not the same task.

A callsign must be correct. A serial number must be correct. Coordinates, formal traffic, an unfamiliar name, or other information that will later be acted upon may need to be captured character for character. In these situations, accuracy may take priority over meaning.

Conversational Morse is different. During a normal QSO, the objective is not to preserve every character that has already passed. The objective is to remain connected to the continuing stream of communication and understand what the other operator is saying.

**Change the listening posture when the receiving objective changes.**

## SHORT-TERM RETENTION

When exact transcription is required, a skilled operator may briefly retain recognized or copied characters before they are written or verified. LICW refers to this as Short-Term Retention. Related delayed-response behavior has historically been described as copying behind. LICW uses the more precise term Short-Term Retention.

The traditional term can be misleading if it suggests that recognition itself occurs behind the incoming signal. In proficient use, recognition may remain current. What is held briefly is material that has already been recognized or copied, while attention remains connected to the signal that is still arriving.

This is more than operator folklore. Research on Morse-code skill acquisition has identified delayed responding as a characteristic of more advanced copying. Wisher, Sabol, and Kern[6] followed students through military Morse-code training and concluded that differences in performance could be explained in part by differing rates of copying behind, describing expert-level copying as a shift toward delayed rather than immediate responding. Their finding supports the idea that the written response may deliberately lag even while recognition and listening continue.

A proficient operator using Short-Term Retention continues listening to the incoming signal while the hand records information received moments earlier. Baddeley's[7] work on working memory showed that recently received information can be maintained temporarily while other cognitive processing continues. In Morse reception, this provides a useful cognitive framework for understanding how recognized or copied characters can be held briefly while attention remains connected to the continuing signal.

Morse-specific research provides additional support for the importance of short-term memory. Guediche and Fiez found that Morse short-term-memory performance was related to Morse comprehension even after differences in perceptual fluency were taken into account.
Short-Term Retention must not be confused with Missed-Copy Fixation.

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[6] Wisher, R. A., Sabol, M. A., & Kern, R. P. (1995). *Modeling acquisition of an advanced skill: The case of Morse code copying.* **Instructional Science, 23**, 381–403. DOI: 10.1007/BF00896879.
[7] Baddeley, A. (2003). *Working memory: Looking back and looking forward.* **Nature Reviews Neuroscience, 4**, 829–839. DOI: 10.1038/nrn1201.

Missed-Copy Fixation occurs when a character or word was not successfully received and the operator continues to dwell on it while the signal moves on.

Attention is redirected away from the continuing signal in an attempt to reconstruct what has already passed. Because working memory and attentional resources are limited, that additional processing can increase the risk that newly arriving information will also be lost.

> **Short-Term Retention preserves recognized or copied information that was successfully received.**
>
> **Missed-Copy Fixation dwells on what was lost.**

They are very different processes.

## WHEN EXACTNESS MATTERS

There are many times on the air when Short-Term Retention may be useful:

- Callsigns
- Signal reports
- Serial numbers
- Names and unfamiliar proper nouns
- Coordinates
- Formal traffic
- Addresses
- Code groups
- Other information requiring exact transcription

In these situations, there may be little contextual help available.

If the other station sends W1AW, three of the four characters are not good enough. The callsign is either correct, or it is not.

The same is true of a serial number, coordinate, or formal message.

Here, Short-Term Retention and exact transcription legitimately carry much of the cognitive burden. The listening posture is narrow, deliberate, and accuracy-centered.

## THEN THE RECEIVING OBJECTIVE CHANGES

Now imagine that the callsign has been copied and the other operator begins:

***HR WX SUNNY 72 DEG ES JUST GOT BACK FROM POTA...***

The receiving objective has changed. The operator no longer needs to preserve every character for later reconstruction. The transmission has become language. Words create context. Phrases develop meaning. One thought leads naturally into another.

Continuing to hold exact-copy material in Short-Term Retention after it is no longer needed can consume attention that would be more useful elsewhere.

This is the moment to change the listening posture.

The task is no longer primarily transcription. The task is comprehension.

## THE FORWARD-LEANING POSTURE

Conversational head copy is forward oriented. The listener remains at the leading edge of the Morse stream, allowing incoming characters to become partial words, words to become phrases, and phrases to become meaning.

Instead of repeatedly asking, *What did he just send?* the developing operator increasingly listens for: *What is he saying now, and where is this thought going?*

That change supports Word Discovery.

A developing word may become recognizable before every character has been consciously assembled. Familiar vocabulary, grammar, rhythm, operating conventions, the subject of the conversation, and previous information all narrow the possibilities.

The operator is no longer treating Morse primarily as a sequence of symbols that must be stored. Morse is becoming language.

## THE FOCUS CHANGES TOO

Changing the listening posture involves more than the direction of attention. It also involves changing the degree and breadth of attention applied to the signal.

Exact Copy requires purposeful attention to the accuracy of specific information, such as callsigns, serial numbers, coordinates, names, and formal messages. That does not require abandoning Loose Focus or analyzing every element consciously. Instead, the operator changes the receiving objective: preserve what was actually sent, mark uncertainty, and verify essential information when possible.

Conversational head copy requires a different kind of attention.

Rather than concentrating intensely on every individual character, the operator adopts a broader, Loose Focus. Attention remains engaged with the signal, but it is not grasping at each sound. This lighter posture allows rhythm, partial words, familiar vocabulary, sentence structure, context, and the developing thought to participate in Word Discovery.

Loose Focus does not mean not paying attention. It is better understood as alert attention without excessive effort.

The operator remains sufficiently attentive to notice meaningful information and unexpected changes while allowing familiar patterns and words to emerge without forcing conscious character-by-character assembly.

This creates a useful contrast:

**Exact Copy: preserve the information actually sent, retaining, recording, and verifying as needed while maintaining Loose Focus.**

**Conversational Head Copy: remain with developing meaning through Loose Focus and forward continuity.**

A skilled operator learns to change listening posture as the communication changes.

A callsign may require close attention and Short-Term Retention. A moment later, the conversation resumes and the operator releases the retained material, broadens the focus, and returns to the continuing stream of meaning.

## WHAT HAPPENED TO THE LAST WORD?

Perhaps nothing.

That is another major change in listening posture.

Suppose part of a sentence is missed:

*I PUT UP A NEW [missed word] YESTERDAY AND IT REALLY IMPROVED MY SIGNAL...*

The developing operator may be tempted to keep working on the missing word. That is Missed-Copy Fixation.

The conversational operator releases it and stays with the transmission.

Perhaps the next few words reveal that the missing word was DIPOLE. Perhaps they do not. Perhaps the word was not important enough to matter.

What matters immediately is protecting the information that is arriving now.

This is the essence of Instant Flow Recovery:

**The next sound is more valuable than the lost sound.**

Conversational listening therefore requires a willingness to release information that cannot immediately be recovered and remain available for what follows.

## ACCURACY HAS NOT BECOME UNIMPORTANT

Listening forward does not mean becoming careless. Nor does conversational head copy mean guessing.

It means matching the listening posture to the receiving objective.

If the sender gives a callsign, copy it accurately. If the sender gives a telephone number, coordinate, serial number, unfamiliar name, or other information that matters, capture it.

If the sender resumes talking about yesterday's POTA activation, release the exact-copy posture and return to meaning. The experienced CW operator may therefore change listening posture several times during a single QSO.

- **Exact information arrives:** Narrow the focus, use Short-Term Retention when needed, and preserve it.
- **Conversation resumes:** Release retained exact-copy material, loosen the focus, and return to meaning.
- **Something is missed:** Avoid Missed-Copy Fixation and return attention to the incoming signal.
- **Meaning continues:** Stay with the stream.

## TWO DIFFERENT PROCESSING PATHS

- For exact written copy, the process may resemble: **Sound -> Recognition -> Short-Term Retention -> Writing -> Verification**
- For conversational head copy, the increasingly desired process is: **Sound -> Word Discovery -> Phrase -> Meaning**

Selective notes can still be made, but they preserve information that has already been understood rather than serving as the mechanism through which understanding occurs.

The important distinction is not whether the operator ever writes. It is what role writing and retention are playing in the receiving process.

## THE INTERMEDIATE TRANSITION

This is why Intermediate development is not simply about increasing WPM. The student is learning when accuracy requires Short-Term Retention and focused attention, when comprehension requires release and Loose Focus, and when a miss requires Instant Flow Recovery rather than Missed-Copy Fixation.

Early Morse experience often trains the learner to believe that every character deserves equal attention and that everything already sent must somehow be preserved.

Conversational fluency requires another capability: allowing completed information to fall away, loosening the conscious grip on individual characters, and leaving attention available for the words and meaning that are still forming.

The mature operator can do both. The operator can briefly retain what was successfully recognized or copied without dwelling on what was missed.

When exact transcription matters, narrow the focus and use Short-Term Retention to hold what must be held. When conversation is flowing, release what no longer needs to be retained, loosen the focus, and allow meaning to emerge. If something is missed, avoid Missed-Copy Fixation and return immediately to the continuing signal.

The goal is not to choose between exact copy and conversational head copy. The goal is to recognize what the communication requires and **change the listening posture accordingly.**

**KEY TAKEAWAY**
There is no single ideal way to receive Morse code. Exact information may require narrower attention and Short-Term Retention, while conversational head copy benefits from Loose Focus, listening forward, and allowing meaning to emerge. Missed-Copy Fixation is unproductive in either case. The accomplished operator changes listening posture according to the receiving objective.

## LISTENING FORWARD, AND WHY HEAD COPY FEELS LIKE MAGIC BY QUENTIN K7DRQ

If you've been head-copying for a while, you've had moments like this: you're a few characters into a word, and before the sender has finished sending it, the word arrives whole in your head. Maybe the sender's signal flickers out for half a second, hidden under QSB, and your brain quietly serves up the next few characters anyway, or you suddenly realize you've been "ahead" of the code for the past few seconds, hearing words form before the dits and dahs have all landed.

It feels mildly miraculous when it happens, but it isn't. We have a name for what your brain is doing, and over the past two decades, neuroscience has built up a fairly serious framework around it. It's called *predictive coding*, and once you see it in your own listening, you can't really unsee it.

### The brain doesn't wait

The traditional picture of perception goes bottom-up: sound waves hit your ear, get decoded into characters, assembled into words, and then understood. It’s a tidy and intuitive notion, but I think it’s mostly wrong. The picture that's emerged from cognitive neuroscience instead (championed in particular by Karl Friston[8] and Andy Clark[9]) is closer to this: your brain is constantly running forward, generating predictions about what it's about to sense. What you experience as "hearing" is mostly your brain

[8] Friston, K. (2010). The free-energy principle: a unified brain theory? *Nature Reviews Neuroscience*, 11(2), 127–138.
[9] Clark, A. (2013). Whatever next? Predictive brains, situated agents, and the future of cognitive science. *Behavioral and Brain Sciences*, 36(3), 181–204.

confirming or correcting its own forecasts. Sensory input isn't the content of perception; it's a correction signal on the prediction.
The brain doesn't wait for the world to deliver. It guesses ahead, and the world either confirms the guess (in which case you barely notice) or contradicts it (in which case you suddenly *do*).

**Hierarchy**

The other key piece is that this prediction machinery is layered. Higher levels of cortex make slower, more abstract predictions ("we're discussing antennas") and pass those predictions down to faster, more concrete levels ("the next word is probably *dipole* or *vertical*"), which pass them down again to the level forecasting the next character, which forecasts the next dit or dah. Predictions flow down. Mismatches climb back up.

When you're in a smooth QSO and everything is clicking, those predictions are mostly right. The corrections flowing back up are small, and effort is low. You float along; as we say at LICW, the code is just *coming to you*. When the topic suddenly turns, when the sender misspells a word, when QRM knocks out a character, predictions break down at one level, mismatches climb the layers, the higher levels scramble to revise - and it feels like grasping, confused, effortful.

This is, I think, the cleanest description of what we already know from sitting in front of a key for years. It's also why context matters so much. Context is what the upper layers know, and what they know constrains everything below. It's why "we just had a long discussion about the rig, so when I miss a few characters in the next sentence, I can probably fill them in." It's why a great fist – clean, rhythmic, predictable – is so much easier to copy than a stuttery one. Predictable input is forecastable input, and forecastable input is input that doesn’t rock the boat.

**Evidence for brain prediction**

I want to share one piece of evidence I find particularly validating, because so many CW ops have felt this. Researchers studying the auditory cortex use what they call *omission paradigms*. They play a regular pattern of sounds (beep beep beep beep) and then, occasionally, silently drop one. There’s just nothing where a sound should have been.

Researchers see that the auditory cortex *responds* to the missing sound: not just to the surprising silence around it, but specifically to the sound that

wasn't there. Heilbron and Chait[10], in a 2018 review of predictive coding evidence in audition, point to omission studies as some of the cleanest direct evidence for genuine forward prediction in the auditory system, rather than mere reactive processing.

Think about every QSB-laden QSO you've ever had. You're copying along fine, and then a wave of QSB hits. A moment later, you find yourself confidently writing or saying the character that was hidden behind the static. You weren't guessing; your auditory cortex was already running the forecast. It had a prediction in flight, the incoming signal failed to arrive, and the prediction held. You've been doing experimental neuroscience to yourself for years, and you just didn't know!

**Neuroscience and LICW teachings**

If your brain is genuinely predicting forward – if listening is mostly forecast-checking – then a lot of LICW philosophy starts to look less like folklore and more like applied neuroscience.

Here's the bridge that ties it all together. Your brain has a limited budget of attention to spend at any given moment. You can spend most of it on the incoming signal, scrutinizing every dit. You can spend most of it on the higher-level forecast, riding the topic and the rhythm. You can't max out both at once. Where you spend your attention budget changes everything about how copy feels.

**Alert indifference** is spending the attention budget wisely. Lean too hard on the incoming signal and every transient thump and hiss becomes a crisis your brain has to deal with – you're "grasping at the code." Lean too light and you stop noticing real surprises (we've all zoned out during a QSO…). The leaf-on-a-pond image I've used in a previous newsletter article is just the right balance: light enough to flow with the forecast, alert enough to register meaningful corrections.

**Letting the code come to you** is letting the prediction machinery work. The conscious mind is at its worst when it interferes. When it tries to manually decode each character, it's effectively dumping the entire attention budget on the incoming signal and starving the upper layers.

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[10] Heilbron, M., & Chait, M. (2018). Great expectations: Is there evidence for predictive coding in auditory cortex ? *Neuroscience*, 389, 54–73.

"Don't think, let the subconscious handle it" is almost mechanical advice: get out of the way and let the layers settle. I say this knowing full well that it's easier said than done, but once you're able to get there, you'll notice how much easier copying gets.

**The Recognition and Retention buffers** we talk about in the Intermediate and Advanced curricula are basically those layers showing up in our working language. Recognition is happening at the level forecasting next characters; retention is happening at the level forecasting next words and gist. They reinforce each other. A strong retention buffer feeds top-down predictions into recognition; strong recognition feeds clean input into retention.

**Sending with a great fist** is a gift you give the receiver's predictive machinery. You're delivering a clean, easily-forecastable stream. Their layers lock in fast. Their attention can stay light, and they can copy you fluidly.

**So what?**

There are two takeaways for me, one practical and one gentler.

The practical one: sharper character recognition will always help, but the bigger gains in copy come from time spent in the flow. This is incidentally what Project OverLearn is all about. The forecasts your brain makes in a QSO get built from real CW running through your ears at conversational speed, with all its rhythms, common words, and operator quirks. Letting characters slip past while staying in the stream isn't tolerating failure - it's giving the predictive machinery the conditions it needs to learn. Subliminal recognition, the Word Discovery mindset, the whole shift from decoding to knowing – these are what predictive coding looks like from the inside.

The gentler one: if some of this lands, please be patient with yourself when copy feels hard. What we're asking the brain to do is genuinely impressive: running forward predictions over a noisy, slow, real-time signal, in a code most of us learned in adulthood, often while QSB and QRM are playing havoc with the input. That it works at all is wonderful. That it eventually feels effortless is, frankly, neuroscience at its most quietly miraculous.

It's not magic. It's just a brain doing what brains do, and a CW op leaning into it.

# A FLOW-BASED PATH TO FLUENCY BY TOM W0FN

## The Challenge with Traditional CW Training

Morse code fluency may be understood as the ability to comprehend meaning while listening and to transmit accurately, rhythmically, and at useful speed.

Traditional training methods often emphasize achieving high character-recognition success before increasing speed. While understandable, that approach can create several limitations:

- **Recognition delay:** Prolonged concentration on isolated-character performance, or on reducing TTR as an end in itself, can postpone the continuous-stream practice needed for real-world fluency.
- **Failure mindset:** Students may interpret misses as failures, creating discouragement and making it harder to continue through imperfect copy.
- **Poor flow recovery:** Overemphasis on recognition accuracy can delay the development of **Instant Flow Recovery (IFR)**, the crucial ability to ignore misses and remain synchronized with the ongoing stream of code.

## A Flow-Based Path to Fluency

The Flow-Based Path to Fluency accelerates progress by emphasizing exposure, continuity, and recovery rather than immediate perfection. It rests on three core elements:

1. **Overlearning character sound units**
   Characters are overlearned not as sequences of dits and dahs, but as distinct acoustic units experienced within conversational character flow. As familiarity grows, **Time To Recognize (TTR)** is reduced through repeated exposure.
2. **A shift from decoding to discovery**
   Students move gradually from slow, conscious character-by-character decoding toward a relaxed **Word Discovery** mindset. The cognitive focus shifts from identifying each element to sensing what word or phrase is emerging.
3. **Instant Flow Recovery (IFR)**
   IFR is the ability to remain in the stream regardless of recognition

success. Recognition is temporarily de-emphasized so that the learner can develop continuity, comfort, and increasing subconscious recognition.

## LICW's Application: Project OverLearn

LICW's Project OverLearn applies these principles by temporarily setting aside the traditional mandate for high recognition success and instead prioritizing comfort with realistic conversational flow.

Its central instructional premise is simple: **flow before perfection**. Students are encouraged to remain in the stream, tolerate misses, and develop growing familiarity with character flow at natural operating speeds.

## Practical Implications

Within this model, several instructional practices become especially important:

- **Exposure and flow:** Students engage in "sound surfing" practice in which the goal is to keep up with the sound stream even when recognition is incomplete.
- **Alert indifference:** Students adopt a "try, but don't care too much" mindset that supports IFR and reduces the emotional cost of misses.
- **Flow-based word recognition:** Practice may include non-CW verbal word recognition or phrase-level listening in order to strengthen word discovery independent of character-by-character decoding.
- **Natural chunking:** Repeated exposure to common patterns such as CQ, DE, TU, THE, RST, and common endings gradually allows those sequences to be heard as rhythmic units rather than assembled character by character.

## Conclusion

Improvement in Morse fluency is not driven by ever lower isolated-character TTR scores. It comes from the joint development of ACR, continuous Character Flow, recovery, Word Discovery, and increasingly direct comprehension under realistic receiving conditions.

Within the LICW academic model, this framework helps explain why fluency emerges through continuity, recovery, and growing subconscious familiarity. Project OverLearn applies these principles to accelerate the

transition from character recognition to word discovery, retention of meaning, and conversational CW fluency.

## THE FLOWING HYDRANT OF CW

Todd N0IP gave LICW a memorable way to describe one of the most important exercises on the path to fluency:

*"putting yourself in front of a flowing hydrant of CW is perhaps the most valuable exercise you can do to attain fluency, then mastery."*

This phrase captures an important principle of flow-based learning. Once students have developed foundational character recognition, they must spend increasing time in the stream of continuous CW. The goal is not perfect copy of every character. The goal is to remain in the flow, allow misses to pass without panic, recover quickly, and let rhythm, context, and repeated exposure gradually develop fluency.

In this sense, the "flowing hydrant of CW" is not random overexposure or exhausting practice. It is purposeful immersion: enough continuous CW to stretch the student, strengthen recovery, and help Morse code become less of a decoding exercise and more of a living language.

## LOOSE FOCUS AND ALERT INDIFFERENCE:

Sustaining focus long enough to copy Morse code accurately is difficult for several reasons. Distractions are common, and continuity can easily be lost after a missed character, when the pace feels overwhelming, or when the operator begins consciously trying to interpret meaning mid-stream.

One of the most common causes of lost continuity is excessive effort. Morse code does require concentration, but over-concentration leads to mental fatigue. That fatigue increases the likelihood of hesitation, frustration, and further disruption of flow.

The preferred mental posture is what LICW describes as **Loose Focus** - a state of relaxed concentration. Morse code is best approached as a lean-back medium, not a lean-forward task. A closely related concept is **Alert Indifference**: remaining mentally attentive while emotionally detached from individual misses. In this state, the operator can stay with the incoming flow without overreacting to each character or word.

Importantly, indifference does not mean apathy or lack of effort. It means applying effort without becoming emotionally entangled in the outcome. At times, increased concentration may be necessary, but added effort carries a cost: it consumes mental capacity that would otherwise support word formation, retention, and comprehension. The goal is to apply only as much effort as the situation requires, and no more.

This mindset supports a style of copying that is balanced, sustainable, and forward-moving. Rather than reacting to each success or miss, the operator learns to remain in the stream, adjust as needed, and continue. Within the Path to Fluency, Loose Focus and Alert Indifference are essential conditions for endurance, recovery, and the development of conversational ease.

**KEY TAKEAWAY**
Loose Focus is relaxed concentration; Alert Indifference is attention without emotional attachment to individual successes or misses. Neither means reduced engagement. The objective is to apply only as much conscious effort as the situation requires, preserving mental capacity for flow, recovery, word formation, retention, and comprehension.

**INCREASING EFFECTIVE SPEED:**

Increasing effective speed is not simply a matter of hearing faster characters. It reflects increasing cognitive efficiency: increasingly Automatic Character Recognition (ACR), reliable recovery, sustained Flow, and retention of developing meaning without recurring bottlenecks.

Within the LICW academic model, effective speed develops through three complementary capabilities:

1. **Automatic Character Recognition (ACR)**
   As familiar acoustic patterns are recognized with less deliberate analysis, attention becomes increasingly available for what follows. Shorter Time To Recognize (TTR) may result, but the teaching objective is increasingly automatic recognition in Flow, not a numerical latency target.
2. **Instant Flow Recovery (IFR)**
   Misses are a normal and unavoidable part of copy at speed. Effective speed increases not by eliminating every miss, but by recovering from misses immediately and preserving continuity. IFR

prevents attention from being pulled backward and allows the operator to remain synchronized with the incoming stream.

3. **Character Flow Proficiency**
   Character Flow Proficiency is the ability to respond to a continuous stream of characters without pausing between letters or reverting to deliberate character-by-character decoding. As this proficiency strengthens, copy becomes more rhythmic, more stable, and increasingly oriented toward comprehension rather than assembly.

Effective speed therefore reflects the combined development of automatic recognition, recovery, and continuity. The goal is sustainable communication at increasingly useful speeds, not performance on a single isolated timing task.

**KEY TAKEAWAY Increasing effective speed depends on ACR, IFR, and Character Flow Proficiency working together. TTR may help describe an aspect of recognition performance but is not an independent instructional goal. Reliable Flow and understanding are better measures of functional progress than isolated speed alone.**

## AUTOMATIC CHARACTER RECOGNITION (ACR) AND TIME TO RECOGNIZE (TTR):

Automatic Character Recognition (ACR) is the learned ability to identify the acoustic pattern of a Morse character without consciously reconstructing its dits and dahs. It is a foundational receiving objective, developed gradually through familiarization, repeated practice, and OverLearn. ACR is not an all-or-nothing achievement; its reliability varies with character familiarity, speed, material, and receiving conditions.

Time To Recognize (TTR) describes the interval between presentation of a recognizable acoustic unit and recognition of that unit. Recognition is never literally instantaneous. Shorter latency may accompany growing automaticity, but reducing TTR is not itself the educational goal, nor does rapid isolated recognition establish continuous Flow, comprehension, or accurate recording.

A practical TTR exercise may include response time, output time, attention, or short-term memory demands in addition to recognition itself. Instructors

should not mistake a practice score for a direct measurement of recognition latency unless the exercise actually isolates and measures that interval. LICW does not prescribe a universal TTR target or treat WPM equivalents as ACR proficiency standards.

**Timing Examples Are Not TTR Measurements**

The timing examples below illustrate conventional Morse spacing at selected speeds; they do not measure when a listener recognizes a character. They should not be used as pass/fail thresholds or as a schedule for achieving automaticity. Their role is explanatory, not evaluative.

When a student struggles, instructors should determine whether the difficulty lies in recognizing the acoustic pattern, retaining recognized material, recording it, or remaining with a continuing stream. Practice should be chosen for the actual limitation rather than simply increasing sending speed.

| | | ***Inter-Character*** | ***Inter-Word*** |
|---|---|---|---|
| BC and INT1 | 12 WPM | 0.300 seconds | 0.700 seconds |
| INT2 | 16 WPM | 0.225 seconds | 0.525 seconds |
| INT3 | 20 WPM | 0.180 seconds | 0.420 seconds |

**INSTANT FLOW RECOVERY (IFR):**

**Instant Flow Recovery (IFR)** is the ability to release a missed character or word immediately and remain synchronized with the ongoing stream of Morse code. Misses are a normal and inevitable part of copy at speed. The goal is not to eliminate them entirely, but to prevent them from breaking continuity or pulling attention backward.

IFR requires a deliberate mental shift. Rather than replaying the miss or attempting to reconstruct what was lost, the operator continues forward with the incoming flow. This prevents the familiar “mental rewind” that causes one missed character to become several.

Within the LICW model, a miss is not treated as a failure but as a minor disturbance in an otherwise continuous process. The operator’s task is to remain in the stream, preserve rhythm, and continue receiving with as little interruption as possible. Over time, IFR becomes more automatic, allowing the listener to stay engaged with the code while the mind gradually develops greater comfort, resilience, and familiarity with flow.

In that sense, IFR is a forward-facing skill. It replaces the reactive habit of error fixation with the more productive habit of flow preservation. The result is a steadier, more confident style of copy that supports comprehension without chasing perfection.

## CHARACTER FLOW:

Automatic recognition is foundational, but not sufficient on its own. A student may recognize every isolated character accurately yet lose continuity when characters arrive successively. The student must learn to remain with the stream rather than pause after each recognition event.

**Character Flow** refers to the ability to process sequences of characters in real time without pausing between individual letters or reverting to deliberate character-by-character assembly. It is the bridge between recognition and fluent comprehension. As Character Flow develops, students begin to sustain rhythm more effectively, anticipate emerging word patterns, and attach meaning before every character has been consciously resolved.

Within the LICW academic model, Character Flow links developing ACR to functional reception. Recognition, retention, and recovery must operate while new sounds keep arriving. As proficiency grows, familiar words and phrases can emerge as larger acoustic units without conscious character-by-character assembly.

## CHARACTER FLOW PROFICIENCY:

Character Flow Proficiency is the growing ability to remain synchronized with a succession of Morse characters with minimal cognitive interruption. It depends on sufficiently automatic recognition, Loose Focus, and the practiced ability to release misses. It is characterized by:

- Recognition of each character as a **single auditory unit**, not as a sequence of dots and dashes
- Fluid transition from one character to the next without hesitation or mental reset
- Preservation of rhythm as characters arrive in continuous succession
- Growing retention of meaning or gist across character groups, words, and short phrases

Character Flow Proficiency is a foundational skill in the development of head copy and conversational-speed Morse code. It marks the transition from active decoding and character-by-character word construction toward continuity, comprehension, and increasing fluency.

This shift in reception can occur in more than one way. One path is brute-force exposure, in which sustained high-density copy eventually exhausts the learner's ability to decode character by character and forces a more intuitive response. A more effective path is a deliberate and well-structured transition guided by qualified instruction, appropriate pacing, and carefully organized practice content. Within the LICW academic model, the goal is to develop Character Flow Proficiency through the latter approach - systematically, supportively, and without unnecessary cognitive overload.

## TRANSITION FROM WORD BUILDING TO WORD DISCOVERY:

Actively building words from individual letters requires intense concentration and is not sustainable at moderate to high speeds. As character flow is overlearned, the cognitive burden of this process begins to decrease, allowing students to move toward more effortless comprehension.

**Word Discovery** is the natural emergence of words in the mind of the listener - not as the result of deliberate, letter-by-letter assembly, but as a byproduct of remaining relaxed, receptive, and engaged with the flow of sound. It reflects a state in which the operator is no longer consciously constructing each word but is increasingly allowing likely words to form through rhythm, familiarity, and context.

Rather than depending on complete word templates or rigid instant-word recognition, Word Discovery involves several interacting processes:

- **Anticipation:** the listener develops a sense of what word may be emerging before it is fully sent
- **Relaxed verification:** the listener notices a likely word and informally tests whether it fits
- **Receptive flow:** attention remains oriented toward the stream of Morse rather than toward reconstructing individual dots and dashes

This state is the opposite of effortful character-by-character construction. It requires letting go of the urge to decode every element consciously and adopting a looser, more trusting listening posture. In that respect, it resembles ordinary spoken-language comprehension, where meaning is

often perceived through context, rhythm, and expectation rather than through deliberate analysis of every unit.

Word Discovery is therefore less a matter of precision than of pattern recognition and probability. It feels more effortless because the mind, once less burdened, becomes increasingly capable of recognizing familiar structures even when they are incomplete, partially obscured, or still unfolding. Within the LICW academic model, this transition marks one of the central shifts from active decoding toward cognitive fluency.

## THE SPECTRUM OF FLUENCY:

### Defining Fluency

In Morse code, fluency is the ability to communicate effectively and naturally - to send, receive, and exchange information in a fluid, conversational manner. It does not require perfect automaticity or instantaneous recognition. A fluent operator maintains flow, sustains rhythm, and conveys or interprets meaning reliably, whether through active decoding, annotation, or intuitive comprehension. At its core, fluency is about enabling real communication smoothly and confidently.

Fluency in Morse code develops along a continuum rather than in sharply divided stages. As skill matures, operators move gradually from deliberate decoding toward effortless comprehension - from consciously assembling characters to simply understanding what they hear. Within this continuum, two broad regions are especially useful: **Functional Fluency** and **Cognitive Fluency**.

### Functional Fluency

Functional Fluency is the ability to operate effectively in Morse code - to send, receive, and sustain copy with minimal hesitation or error - while still relying primarily on active word construction from individual letters or annotation. This process requires focus and effort; the operator's attention remains anchored in decoding.

Like a non-native speaker who can converse smoothly but still translates mentally, performance may appear fluid even though thought and meaning remain somewhat separate. The operator is fluent in execution, but not yet fully fluent in comprehension.

Functional Fluency is a meaningful and worthwhile achievement. It supports competent and enjoyable CW operation in activities such as traffic handling, SOTA and POTA activations, contesting, and everyday ragchewing. For many operators, this level represents a deeply satisfying and enduring form of Morse code capability.

## Cognitive Fluency

Cognitive Fluency marks the transition from active decoding to intuitive comprehension. Through overlearning of character flow, patterns become so familiar that recognition grows increasingly automatic, effortless, and independent of conscious control.

As cognitive load decreases, words are no longer assembled so much as discovered. Cognitive Fluency is what makes sustained copy at conversational speeds above 20 WPM increasingly possible and enjoyable, and what ultimately supports comfortable QRQ development at still higher speeds.

At this stage, the listener begins to experience the spontaneous emergence of meaning known as **Word Discovery** - when comprehension arises naturally from rhythm, context, and flow rather than from conscious decoding.

## Fluency Within the Continuous Developmental Model

Within LICW's continuous developmental model, fluency occupies the middle phase between foundational operating competence and mastery. The Path to Fluency extends from INT1 through ADV1 and represents the climb from effortful decoding toward increasingly natural conversational communication.

At its upper end, ADV1 serves as the culminating stage of the Path to Fluency. At this level, students consolidate continuity, recovery, word discovery, and conversational head copy into more relaxed and durable operation.

For those who continue into ADV2 and ADV3, fluency is not replaced; it is extended. The Path from Fluency to Mastery builds on conversational fluency by strengthening cognitive ease under greater speed, density, and endurance demands.

Mastery is therefore not separate from fluency. It is the further development of fluency into higher-speed, lower-effort, and more durable Morse code operation.

### A Continuous Progression

Functional and Cognitive Fluency are best understood not as separate achievements, but as points along a continuous path of growth. Every operator occupies a different place on this spectrum, and progress is rarely linear. Over time, active decoding gives way to flow, and effort gives way to ease - the hallmark of mature Morse fluency.

Within LICW's academic structure, this continuous progression helps explain why **INT1 through ADV1** belong properly to the **Path to Fluency**, while **ADV2 and ADV3** extend that same development into the **Path from Fluency to Mastery**. The underlying process remains the same: Morse code is heard less as separate symbols and increasingly as meaningful sound. What changes is the degree of ease, speed, endurance, and cognitive freedom with which that communication can be sustained.

The reason this spectrum matters is practical. It helps instructors and students understand that conversational capability does not appear all at once, and that fluency does not have a single rigid threshold. A student may already be functionally fluent in many real operating contexts while still climbing toward deeper cognitive fluency. In the same way, a student entering mastery is not leaving fluency behind, but extending it into QRQ communication with increasing naturalness and less conscious effort.

**KEY TAKEAWAY**
Fluency is a continuum, not a switch. Functional fluency permits effective operating even when decoding or annotation still requires effort; cognitive fluency emerges as recognition becomes more automatic and meaning more direct. Mastery extends - rather than replaces - that fluency into greater speed, density, endurance, and ease.

## ANNOTATIVE COPY, NOTE TAKING, AND HEAD COPY:

At this stage of development, not all students are ready to rely primarily on head copy, and that is entirely appropriate. Writing during reception remains both normal and productive throughout the Intermediate curriculum. It is important, however, to distinguish between annotative

copy and note taking because they represent very different ways of processing Morse code.

Within the LICW academic model, **annotative copy** refers to writing down nearly every character or word as it is received and then reading the written text to determine what was sent. The student's attention is directed primarily toward converting sound into written symbols. Comprehension is often deferred until the student reads the completed text.

The processing sequence is generally:

**Sound → Character Recognition → Writing → Reading → Meaning**

Annotative copy can be extremely useful when exact transcription is required. It is appropriate for formal traffic, unfamiliar callsigns, serial numbers, addresses, technical information, and other material that must be reproduced accurately. It also provides an important bridge for developing students who can recognize characters but are not yet able to hold longer words, phrases, or ideas in working memory.

The limitation is that complete annotation can become the student's primary receiving strategy. Writing every character requires time and attention. If the student falls behind, the natural tendency is to look back at the page, reconstruct a missed word, or attempt to complete an unfinished thought. Attention then moves away from the incoming stream. What began as a useful transcription tool can interfere with listening forward, Instant Flow Recovery, word discovery, and conversational comprehension.

This distinction is supported by research showing that strong Morse transcription ability alone does not fully account for comprehension. Conversational fluency therefore requires deliberate practice in deriving meaning from the incoming sound stream rather than relying exclusively on written transcription.

**Note taking is fundamentally different.** In note taking, the operator understands the communication primarily through head copy and writes only selected information that may need to be remembered, logged, or used later. Writing supports recollection; it is not the mechanism through which meaning is discovered.

The processing sequence becomes:

**Sound → Meaning → Selective Note Taking**

The defining distinction is simple: **in annotative copy, writing is used to discover meaning. In note taking, writing is used to preserve meaning that has already been understood.**

For example, during a conversational QSO, an operator may understand the greeting, weather discussion, station description, and personal comments directly through head copy while writing only:

- The other station's callsign
- The operator's name and location
- The signal report
- Equipment or antenna details of particular interest
- A question to answer during the next transmission
- A personal detail worth remembering later

Suppose the other operator sends:

"NAME IS JOHN QTH DENVER RUNNING 100 WATTS TO A DIPOLE JUST RETURNED FROM A TRIP TO ALASKA."

An operator using annotative copy may attempt to write every word and then read the completed line to understand the message. An operator using head copy and selective note taking may understand the statement as it arrives and write only:

**JOHN - DENVER - 100W - DIPOLE - ALASKA TRIP**

The notes preserve the details needed for recollection and response, while the meaning of the communication is followed in real time.

The same distinction appears in other operating situations. During a POTA, SOTA, or contest exchange, an operator may head copy the routine structure and rhythm of the contact while writing or logging the callsign, signal report, state, section, or serial number. During a net, the operator may follow the discussion through head copy while recording callsigns, assignments, locations, or action items. In a ragchew, the operator may

understand nearly everything in the head while making only a few brief notes to support a thoughtful reply.

The balance between annotation, note taking, and head copy changes with the demands of the communication. Formal traffic handling and information that must be reproduced exactly may require extensive transcription. A relaxed conversation with familiar vocabulary and strong contextual support may require very little writing.

This distinction also marks an important developmental break. A student who has relied on complete annotation cannot acquire head-copy skills simply by writing a little less. At some point, the student must deliberately put the pen down and begin processing the incoming stream without using written text as the path to meaning.

That transition is rarely comfortable. The student should expect an initial decline in apparent performance because the familiar skill of transcription is being set aside while entirely new skills are developed. Recognition may feel less dependable, retention may be limited, and comprehension may seem fragmented. These difficulties do not indicate regression. They are normal signs that the learner is building the ability to remain with the stream, retain meaning in working memory, use context, discover words, and recover without looking back.

During this transition period, success should not be measured by how much was copied correctly. The more important measures are whether the student remained attentive to the incoming stream, resisted the urge to reconstruct missed material, recovered quickly, and understood whatever meaning emerged. Temporary discomfort and reduced accuracy are expected parts of developing a fundamentally different receiving skill.

Once meaning can be followed directly through head copy, writing may be reintroduced selectively as note taking. At that point, the operator is no longer writing in order to discover what was said. The operator understands the communication as it arrives and records only those details that may need to be remembered, logged, or used in a reply.

Within the LICW academic model, the transition is therefore not a gradual reduction in annotation. It is a deliberate shift from transcription to direct comprehension, followed later by the purposeful reintroduction of writing as a tool for recollection rather than understanding.

**KEY TAKEAWAY**
Writing can serve two very different purposes. In annotative copy, writing is used to discover meaning; in note taking, writing preserves details that have already been understood. The transition to head copy therefore requires learning to comprehend without using transcription as the path to meaning, after which writing can be reintroduced selectively.

## INTERMEDIATE SENDING:

**Intermediate Sending** is intended for students who can already send comfortably at **12 WPM** and are ready to progress further. At this stage, the emphasis shifts from scripted character and word production toward more natural communication, greater endurance, and increasing effective sending speed.

Practice in these classes centers on **speed drills, QSOs, and ragchews**. Students move beyond short words and phrases and begin working on sustained sending that more closely reflects real-world exchanges. Mistakes are expected, but students are trained to correct smoothly and preserve rhythm rather than stopping and restarting.

By practicing in realistic communication formats, students learn to maintain continuity, hold the flow of an exchange, and gradually extend their effective sending range. Within the LICW academic model, Intermediate Sending functions as the bridge between early sending competency and fluent, conversational transmission.

## CONNECTING SENDING TO RECOGNITION:

Many students initially treat sending as a separate skill - useful for getting on the air, but only loosely related to improvement in copy. Within the LICW model, however, sending can directly strengthen recognition when it is practiced in a way that reinforces the same sound patterns required for fluent reception. When a student hears a character or word and then sends it immediately, an ear-brain-hand loop is formed that strengthens both recognition and production.

This process links **acoustic patterns** (what is heard) to **motor patterns** (what is sent). Over time, repeated alignment between the two helps the learner move from conscious effort toward more automatic recognition.

## Why LICW Uses “Hear It, Send It”

Within the LICW model, purposeful sending can reinforce the same rhythmic acoustic patterns involved in reception. When a student hears a character or word and then sends it immediately, the learner hears the rhythm, physically produces it, and hears the result again as auditory feedback. This ear-brain-hand loop may support sound familiarity, rhythm, recall, and recognition.

## How Sending Reinforces the Three Pillars of Fluency Development

**1. Automatic Character Recognition (ACR) and the Acoustic-Motor Loop Sending physically reproduces a character’s rhythm.**
Repeated association between the acoustic pattern and the sending movement can help reinforce direct, increasingly automatic recognition. A useful practice strategy is to send at two speeds:

- One comfortable, accurate speed
- One speed approximately 4 WPM faster

This variation helps prevent recognition from depending on only one timing pattern. Familiarity and recognition latency may both improve, but the instructional objective is ACR that transfers to real listening, not reducing a TTR number.

**2. Instant Flow Recovery (IFR) and Physical Resilience**
Good sending practice is not perfect sending practice. It includes learning to remain in motion when a minor sending error occurs. The same emotional neutrality that supports recovery in reception also supports recovery in transmission.

Exercises such as sending the alphabet, numbers, and short words help train the hand to continue smoothly after a slip rather than stop, reset, or overcorrect. A hand trained to keep flowing helps build a mind that keeps flowing.

**3. Character Flow Proficiency and Rhythmic Signatures**
Many common CW items are eventually experienced not as separate letters, but as rhythmic units. When students send common words and patterns smoothly - such as **THE, CQ, DE, TU, 5NN**, and familiar endings like **-ING** or **-ED** - they begin to internalize those forms as connected rhythmic shapes rather than sequences assembled character by character.

This supports the transition from analytical decoding toward chunking, anticipation, and word discovery.

### How to Practice Effectively

The “Hear It, Send It” approach works best when several principles are observed:

1. **No corrections.** Do not restart or repair minor errors; continue forward.
2. **Prioritize flow over perfection.** The goal is continuity with good rhythm, not flawless output.
3. **Keep the delay short.** The exercise should require attention, but not panic.
4. **Aim for relaxed rhythm.** Use a light touch, relaxed wrist, and consistent spacing.
5. **Track progress by feel.** One early sign of improvement is that both sending and copying begin to feel calmer and more automatic.

### The Big Idea

Sending is not merely an output skill. Practiced correctly, it becomes a recognition accelerator by linking the sound patterns the student must recognize to the physical rhythms the body can reproduce reliably. Within the LICW academic model, sending therefore functions not as a separate discipline, but as one of the most efficient ways to strengthen recognition, recovery, and character flow.

**KEY TAKEAWAY**
Sending is not merely an output skill. When practiced as an ear-brain-hand activity, it reinforces the same acoustic patterns required for reception. Hearing, producing, and hearing the rhythm again can strengthen recognition, recovery, Character Flow, and the transition toward increasingly automatic processing.

## CLASS SCHEDULES:

To the extent feasible, Intermediate and Advanced classes are scheduled at consistent times Monday through Friday in order to encourage stable participation by the same group of students. LICW has found that the continuity of attendance in these classes helps foster a supportive learning environment and strengthens what the club refers to as the **cohort effect**.

The curriculum is also designed with meaningful overlap between adjacent class levels. Students are encouraged to attend two levels at the same time: one that functions as a **comfort-zone class** and one that functions as a **stretch class**. Over time, the stretch class typically becomes the comfort-zone class, supporting steady progression into the next level of learning.

Within the LICW academic model, schedule design is therefore not merely logistical. It is used intentionally to reinforce continuity, peer support, progressive challenge, and steady advancement through the curriculum.

## ESSENTIAL OPERATING SUBJECTS:

**Essential Operating Subjects** classes broaden students' understanding of CW operating by introducing practical topics, operating contexts, and support resources that extend beyond copy and sending skill alone. These sessions are taught by experienced operators who bring practical knowledge and real-world perspective to the academic program.

Students are encouraged to begin attending these classes as soon as they enter the **Intermediate curriculum**. Because the range of topics is broad, it may take several months of steady participation to encounter the full cycle of material.

Topics include:

- *Am I Getting Out? Can You Hear Me?*
- Field Day
- Introduction to Contesting
- Logging Programs
- Portable Operations
- POTA (Parks on the Air)
- QRP Clubs
- QSLing in an Online World
- SKCC – SKED Page, Logger, Elmer Program, Events

- Spotting Programs
- WA7BNM Contest Calendar
- Weekly Contests – K1USN SST, MST, CWT

Within the LICW academic model, Essential Operating Subjects serves to connect classroom skill development with the practical knowledge, operating culture, and support systems that help students become more capable and confident operators.

## EXACT COPY PROGRAM

The LICW Exact Copy program is being developed as a supplemental academic offering for students who want to improve their ability to receive critical information accurately, consistently, and reliably at useful operating speeds. Callsigns, signal reports, serial numbers, names, park and summit references, frequencies, traffic, coordinates, and other information may sometimes need to be received exactly rather than merely understood in context.

Exact Copy and Conversational Head Copy share the same foundation of ACR, Continuous Flow, Loose Focus, and Instant Flow Recovery. Conversational reception is oriented toward developing meaning; Exact Copy is oriented toward preserving the actual information sent. The operator shifts listening posture according to the receiving objective, not by abandoning relaxed reception or adopting a new character-recognition method. Exact Copy sometimes requires additional learned responses such as temporary retention, writing, typing, logging, and verification; those actions do not define the underlying recognition process.

Conditioned response is the learned action that may follow recognition. For one receiving objective, a recognized character may prompt writing, typing, or logging; for another, recognized material is retained and integrated into meaning. LICW trains flexibility between these responses. Recording is an additional demand when an accurate record is needed, not the defining difference between Exact Copy and Conversational Head Copy.

The program will emphasize four dimensions of performance: accuracy, speed, consistency, and reliability. Training can separately address recognition, retention, recording, and verification so that a recording bottleneck is not automatically treated as a TTR problem. Practice will

progressively introduce realistic senders, signals, QRM, fading, unfamiliar material, and operating demands.

Exact Copy is not another speed class or a promotion track. Students work on the same skills while varying speed, content, retention, and signal conditions to suit their proficiency. Guided sessions introduce concepts and exercises; sustained gains are expected to come from purposeful independent practice and on-air application.

# *ADVANCED CURRICULUM: THE PATH FROM FLUENCY TO MASTERY*

## CURRICULUM OVERVIEW:

The Advanced curriculum occupies the upper end of the LICW academic program. It consists of three progressive levels designed to help students strengthen conversational fluency and, for those who continue climbing, extend that fluency into mastery at increasingly higher speeds.

Within this framework, **Advanced 1 serves as the culminating stage of the Path to Fluency**, while **Advanced 2 and Advanced 3 constitute the Path from Fluency to Mastery**. In that sense, the Advanced curriculum functions both as the culmination of the Path to Fluency and the beginning of the Path from Fluency to Mastery.

At this stage, success is defined not only by speed, but by a relaxed Word Discovery mindset in which comprehension begins to flow more naturally. The instructional emphasis shifts away from perfect character-by-character copy and toward continuity, gist, endurance, and increasingly natural conversational rhythm, even during extended and higher-speed exchanges.

Students typically enter Advanced 1 proficient at 18–20 WPM. By that point, they are generally able to express themselves with relative ease, maintain some regular on-air presence, and participate in a variety of CW activities ranging from ragchewing to contest-style exchanges. The central task in Advanced 1 is to consolidate those abilities into more relaxed, durable, and increasingly conversational fluency.

The Advanced curriculum builds directly on the flow, head-copy, and comprehension skills developed in the Intermediate program. Its methods and exercises therefore remain familiar in structure while gradually increasing speed, complexity, endurance, and conversational depth. The program also serves experienced operators who learned Morse code elsewhere but wish to develop stronger conversational head copy through LICW's structured, flow-based approach.

## QRQ (High-Speed Telegraphy)

Normal spoken language occurs at roughly 110–150 words per minute, while 20–25 WPM represents a typical conversational Morse code speed. Many operators naturally aspire to go faster.

QRQ refers to Morse code operation above 25 WPM. Although these speeds may seem daunting at first, they are achievable through structured practice, appropriate mindset, and sustained exposure to fluent character flow. Within the LICW academic model, QRQ development belongs primarily to the Path from Fluency to Mastery.

## ADVANCED LEVELS:

The Advanced curriculum is organized as a three-level progression in which conversational fluency is first consolidated and then extended into increasingly higher-speed, lower-effort operating.

### ADVANCED 1

**Proficiency Objective:** Conversational head copy and sending at 20–25 WPM
**Role:** Culminating stage of the Path to Fluency
**Focus:** Consolidating Intermediate-level flow skills while strengthening relaxed copy, endurance, continuity, and conversational ease at ordinary conversational speeds.

### ADVANCED 2 (QRQ)

**Proficiency Objective:** Mastery at 25–35 WPM
**Role:** Entry into the Path from Fluency to Mastery
**Focus:** Extending fluency beyond ordinary conversational pace, increasing resilience under higher-speed exchanges, and deepening the Word Discovery mindset as Morse becomes easier to process with less conscious effort.

### ADVANCED 3 (QRQ)

**Proficiency Objective:** Mastery at 35–45+ WPM
**Role:** Further development within the Path from Fluency to Mastery
**Focus:** Sustaining high-speed QRQ operation with growing confidence, ease, endurance, and increasingly effortless comprehension, so that Morse functions as a true conversational medium at its highest practical levels.

## THE QRQ CREW CLUB:

The QRQ Crew Club is a community dedicated to introducing amateur radio operators to the practice, culture, and techniques of high-speed CW operation, generally **35 WPM and above**, in a welcoming and non-judgmental environment. Within the LICW academic model, it serves as a natural complement to the **Advanced curriculum** by providing an on-air "next hill" for students who wish to continue developing beyond conventional conversational speeds.

QRQ Crew offers regular on-air activities, including **QRQuesday** weekly activity nights, that make it easier for faster-speed operators to find one another and build confidence through real QSOs. LICW encourages Advanced students to participate in these activities as a way of extending academic development into authentic on-air operating and strengthening the culture of high-speed manual CW.

Membership in QRQ Crew is free, and **LICW Advanced 2 and 3 students** are encouraged to explore and, where appropriate, pursue membership. QRQ Crew promotes **manual CW sent by hand and copied by ear**, without keyboards or decoders, and welcomes operation with straight keys, bugs, paddles, and cooties.

Interested operators can locate QRQ Crew members through the **RBN Club Activity Spotter** and other spotting resources, and may use those tools, together with the QRQ Crew roster, to identify opportunities for practice QSOs and eventual membership qualification.

# *OVERLEARN BOOTCAMP:*

## OVERVIEW:

OverLearn Bootcamp is a high-intensity, immersive training program designed to help a broad range of students acquire the attitudes, listening behaviors, and flow skills involved in reaching Morse code fluency.

Bootcamp is not primarily about increasing the percentage of characters copied correctly. It is about changing the habits that interfere with copy during flow - especially the tendency to hold on to missed characters, look backward, interrupt the stream, and judge performance by recognition perfection.

Bootcamp is not a silver bullet, nor is it the end of the journey. It is a month-long jump-start intended to deepen the student's understanding of the concepts, skills, and mental transitions that support Morse code fluency. Through focused practice and guided experience, students learn to let misses go, recover immediately, remain synchronized with the stream, and listen forward with greater confidence.

Bootcamp is one unified program rather than a sequence of level-based tiers. Students at different stages of the Intermediate and early Advanced curriculum participate in the same core lessons because the essential attitudes and flow behaviors are common to every stage of fluency development. Individual challenge is adjusted through flow rate, content complexity, practice selection, and the student's present ability to recognize meaning within the stream.

Bootcamp is not a replacement for the regular LICW curriculum. It is a focused accelerator alongside Intermediate or Advanced classes, independent practice, and on-air operating. Regular instruction develops ACR, vocabulary, comprehension, and operating competence over time. Bootcamp concentrates on the forward-facing receiving posture and the habits that let those capabilities work together in continuous Flow.

### The Bootcamp Mental Shift

Traditional learners often approach Morse code with a maximum-recognition mindset. In that model, the primary goal is to identify every character correctly, and each miss is experienced as a failure. Attention is repeatedly pulled backward in an attempt to recover what was lost. As

speed and density increase, this perfection-oriented posture becomes mentally exhausting and ultimately unsustainable.

Bootcamp cultivates a flow-first mindset. The student's primary task is to remain in the stream, hear each character as a complete acoustic sound, stay alert for recognition, and recover instantly from misses without looking back. The desired posture is relaxed, attentive, forward-looking, and emotionally neutral. Recognition remains important, but it is not allowed to interrupt continuity.

By normalizing misses, Bootcamp helps decouple the emotional sting of non-recognition from the physical act of listening. This reduces the startle response that breaks continuity and pulls attention backward. Accuracy improves through repeated exposure, growing familiarity, and increasing comfort with the sound stream, but it develops as a consequence of stronger flow rather than as the condition required to remain in flow.

### Maximum Recognition Mindset vs. The Bootcamp Mindset

| FEATURE | TRADITIONAL MINDSET | BOOTCAMP MINDSET (FLOW) |
|---|---|---|
| **Primary Goal** | Maximum Accuracy | Just Hear Every Character |
| **Reaction to Misses** | "Wait, what was that?" | Instant Flow Recovery (Maintain forward momentum, never look back) |
| **Mental State** | Strenuous, "Hard Thinking" | Relaxed and alert, enjoy recognition, yet remain indifferent to the outcome |
| **Speed Barrier** | Hard ceiling: A character-by-character "thought process" is exhausting and unsustainable | High ceiling: pattern recognition, flow-based listening, mental 'river of sound' comprehension |
| **Emotional Tone** | Perfectionism/Frustration | Emotional Tranquility |

### Five Pillars of Flow Development

Within Project OverLearn, Bootcamp reinforces five closely related dimensions of Flow development. Automatic recognition grows through

repeated exposure; the live Bootcamp chiefly teaches and reinforces the behaviors that support ongoing progress.

**1. Alert Indifference**
Students learn to remain alert for recognition while emotionally indifferent to both misses and successful “gets.” This calm, non-reactive posture helps preserve the mental state required for flow.

**2. Instant Flow Recovery (IFR)**
Students develop the ability to ignore misses immediately and remain synchronized with the incoming stream. IFR is the discipline of never looking back.

**3. Character Flow Proficiency (CFP)**
As Alert Indifference and IFR strengthen, students become increasingly able to hear each character as a distinct acoustic unit during continuous flow, whether full recognition occurs in the moment or not.

**4. Automatic Character Recognition (ACR)**
Through repeated exposure to Morse as complete acoustic patterns, characters become increasingly familiar and are recognized with less conscious analysis. TTR may become shorter as a result, but Bootcamp does not set a latency goal or use recognition speed as its principal measure of success.

**5. Word Discovery and Comprehension**
As ACR and Character Flow become more reliable, familiar words and phrases may emerge as units of meaning. This supports the forward-facing listening posture taught in Bootcamp: remain in the incoming stream, allow meaning to develop, and avoid forcing conscious character-by-character assembly.

## The Cognitive Shift: From Thinking to Knowing

A central premise of Project OverLearn follows directly from the LICW Method:

**CW is not learned; it is practiced into automaticity.**

Bootcamp can explain this transition, demonstrate it, and teach students how to practice for it. But Bootcamp cannot produce automaticity simply by teaching the concept. Automaticity develops through the repeated experience that follows.

One of Bootcamp's central aims is to change how students listen, which changes how the brain processes Morse code during flow. A major barrier to fluency is the thinking gap - the effortful process of consciously translating or reconstructing each character before moving to the next. That process may function at slower speeds, but it is too slow and mentally expensive for fluent conversational code.

Bootcamp works toward a different state: increasingly automatic knowing rather than effortful decoding. As character sounds are overlearned as unified acoustic patterns, recognition becomes less dependent on deliberate analysis and more immediately available in a continuing stream. ACR is the developmental goal; continuity, recovery, and forward listening allow recognition to contribute to emerging words and meaning.

**KEY TAKEAWAY Bootcamp can teach and reinforce listening behaviors that support fluency, but cannot produce automaticity by explanation alone. Its purpose is to accelerate the shift from perfection-oriented decoding toward ACR in Continuous Flow, Loose Focus, and immediate recovery. Repeated practice and sustained exposure develop automaticity over time.**

## ONE UNIFIED BOOTCAMP:

All students complete the same eight-lesson sequence and are introduced to the same concepts, vocabulary, attitudes, and hierarchy of skills. The unified design recognizes that a student working on early Intermediate flow and a student approaching conversational fluency may differ greatly in recognition and comprehension, yet both may be limited by the same underlying behaviors: perfectionism, delayed recovery, looking back, overthinking, and loss of synchronization with the stream.

The program therefore establishes common behavioral objectives while allowing the listening challenge to scale naturally. Developing students may focus primarily on remaining relaxed during high miss rates, hearing unique character sounds, and recovering instantly. More experienced students may use the same exercises to deepen word discovery, follow longer trains of thought, increase endurance, and reduce conscious effort.

The lesson is shared; the developmental work taking place within the lesson is individual.

## DIFFERENTIATED PRACTICE WITHIN THE COMMON PROGRAM:

Bootcamp accommodates a broad range of skill levels through controlled variation rather than separate tiers. Practice may be differentiated through:

- Multiple character and word flow rates that place each student beyond the present comfort zone without turning the exercise into a recognition test.
- Fast-to-slow “Speed Racer” playback that exposes students to fluent sound patterns before returning to a more accessible rate.
- A progression from alphabet and number flow into short words, phrases, common expressions, longer content, and increasingly conversational material.
- Different recognition expectations. A less experienced student may recognize very little while successfully practicing Alert Indifference and Instant Flow Recovery. A more experienced student may recognize words and meaning while practicing the same continuity and recovery behaviors.
- Receiving and sending exercises that reinforce rhythm, acoustic familiarity, motor memory, and comprehension as related parts of the same learning process.

Students should not compare their recognition percentage with that of other participants. Success is determined by whether the student remains engaged, listens forward, releases misses, and remains “in the stream” without emotional or cognitive disruption.

## PROGRAM STRUCTURE AND COMMITMENT:

Bootcamp is conducted as an eight-lesson program over approximately four weeks. The standard format includes two live Zoom sessions each week and focused home practice between sessions. The live sessions introduce and reinforce the core concepts, provide guided exposure to fluent code, and allow instructors to observe student behavior and provide corrective coaching. Daily practice develops the repetition and familiarity that cannot be created through class attendance alone.

Unlike the more flexible format of regular LICW classes, Bootcamp requires a substantial and consistent commitment. Students should enter with the intention of attending the live sessions, completing the assigned practice, participating honestly in self-assessment, and remaining engaged even when recognition is low. The program's value comes from repeated exposure and sustained behavioral practice across the full cycle.
Class size is limited to 25 students to preserve an effective student-to-instructor ratio, maintain a supportive cohort environment, and provide each participant with meaningful observation, guidance, and encouragement.

**READINESS AND ELIGIBILITY:**

Bootcamp eligibility is based on readiness for the unified experience rather than placement into a particular tier. A specific copying percentage or fixed words-per-minute threshold is not required. Bootcamp students are not asked to report whether they recognized particular content. Character Flow Proficiency is the primary goal, and recognition success during fluent CW flow rates is not emphasized. Students should, however, possess enough foundational character knowledge to participate meaningfully in continuous-flow practice.

In general, students should:

- Know the 44 basic Morse characters as sounds and have begun working beyond isolated character recognition.
- Be participating in the Intermediate curriculum, early Advanced curriculum, or possess comparable experience.
- Be able and willing to participate in fast-paced drills, guided repetition, and extended periods of continuous listening.
- Accept that high miss rates are intentional and that recognition percentage is not the primary measure of Bootcamp performance.
- Be willing to remain engaged, release misses, avoid looking back, and continue forward rather than stop and reset.
- Be prepared to attend the live sessions and complete the assigned home practice throughout the program.

Students who know the characters but remain unsure whether they are ready should consult a Bootcamp instructor or their regular LICW

instructor. Readiness should be judged primarily by willingness to engage with flow and commit to the process, not by confidence, speed, or freedom from mistakes.

## LEARNING OBJECTIVES:

By the conclusion of Bootcamp, students should understand and be able to practice the following:

- Hear Morse characters increasingly as distinct acoustic patterns and understand ACR as the long-term recognition objective rather than instantaneous identification.
- Maintain a relaxed and alert listening posture during continuous flow.
- Treat recognition and non-recognition as emotional equals.
- Use Instant Flow Recovery to release misses immediately and remain synchronized with the stream.
- Prioritize Character Flow Proficiency over recognition success.
- Recognize the difference between looking back and listening forward.
- Use multiple flow rates and increasingly extended content flow without turning practice into a test of perfect copy.
- Understand how repeated exposure develops ACR and how Character Flow, Word Discovery, and comprehension emerge over time.
- Continue the Bootcamp habits through regular LICW classes, productive independent practice, and on-air operating.

## OVERLEARN CAPSTONE EVENTS - CONSOLIDATION, FLUENCY, AND ENDURANCE:

OverLearn Capstone events bring Bootcamp graduates together in a supportive, high-energy environment to reinforce the habits, skills, and mindset developed during Bootcamp. These are light, enjoyable, and celebratory sessions while remaining grounded in the core principles of Project OverLearn: intuitive pattern recognition, continuity of flow, immediate recovery after misses, and comfort at conversational speeds.

The purpose of OverLearn Capstone events is not to introduce a new curriculum layer, but to consolidate what has already been built. These events give students an opportunity to revisit and strengthen the habits of flow, resilience, and endurance developed during Bootcamp, while doing so in a setting that emphasizes momentum, camaraderie, and confidence.

Capstone events also help preserve continuity after the four-week Bootcamp cycle ends. They provide a way for students to remain engaged with one another, continue practicing under live conditions, and reinforce the forward-looking mindset that Bootcamp seeks to develop.

Within the LICW academic model, Capstone events function as a bridge between intensive training and continued long-term development. They help students retain and grow the gains achieved in Bootcamp, strengthen their sense of progress, and carry the Bootcamp mindset back into the regular curriculum and on-air operating.