BEGINNERS, INTERMEDIATE, AND ADVANCED CURRICULUMS

THE PATH TO MORSE CODE PROFICIENCY, FLUENCY, AND MASTERY

ACADEMIC REFERENCE GUIDE

VERSION 1.9

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REVISION HIGHLIGHTS:

Version 1.9 reorganizes the LICW academic materials into a clearer three-document structure, separating student guidance, curriculum reference, and academic method/succession material.

The **Student Guide** provides concise, member-facing guidance to help students understand where they fit in the curriculum and what steps they should take next.

The **Academic Reference Guide** now serves as the primary reference for the LICW curriculum itself. It describes the club's academic progression, class structure, instructional terminology, training tools, and the continuous learning path from proficiency to fluency to mastery.

The companion **LICW Academic Method and Succession Guide** preserves the supporting philosophy, curriculum rationale, instructional positions, and succession guidance that explain why the LICW method is structured as it is.

This revision makes the Academic Reference Guide easier to use while preserving student-facing guidance and deeper academic rationale in separate companion documents.

TABLE OF CONTENTS:

LIST OF ABBREVIATIONS:

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

PREFACE:

LICW now publishes three separate academic documents.

The **Student Guide** is the short-form companion document for members. It is designed to help students get started quickly, understand where they fit in the curriculum, and identify the classes, practice activities, and resources that will help them move forward with confidence.

The **Academic Reference Guide** is the primary reference document for the LICW academic program. It describes the curriculum structure, class progression, instructional terminology, training tools, and the continuous learning path from proficiency to fluency to mastery.

The **LICW Academic Continuity Guide** preserves the instructional philosophy, curriculum rationale, position papers, and academic succession guidance that explain why the LICW method is structured as it is.

This separation reflects purpose. Students generally need a concise guide to what they should do next. Instructors, curriculum developers, and club leaders need both a practical curriculum reference and a deeper academic guide that preserves the principles behind the method. Together, these documents support clarity, consistency, and continuity as LICW continues to evolve.

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 Academic Reference Guide focuses on what LICW teaches and how the academic program is organized. The companion **LICW Academic Method and Succession Guide** explains why the LICW method is structured as it is and preserves the deeper instructional philosophy, curriculum rationale, and academic succession framework.

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. Those ideas have been modernized through Project OverLearn and refined through extensive classroom experience.

In short, the **Student Guide** explains the essentials a member needs in order to begin and progress. The **Academic Reference Guide** explains the structure of the academic program. The **LICW Academic Method and Succession 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

[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.

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. 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 are normal and temporary.

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 Academic Method and Succession 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 comprise at least **25%** of total practice time. 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.

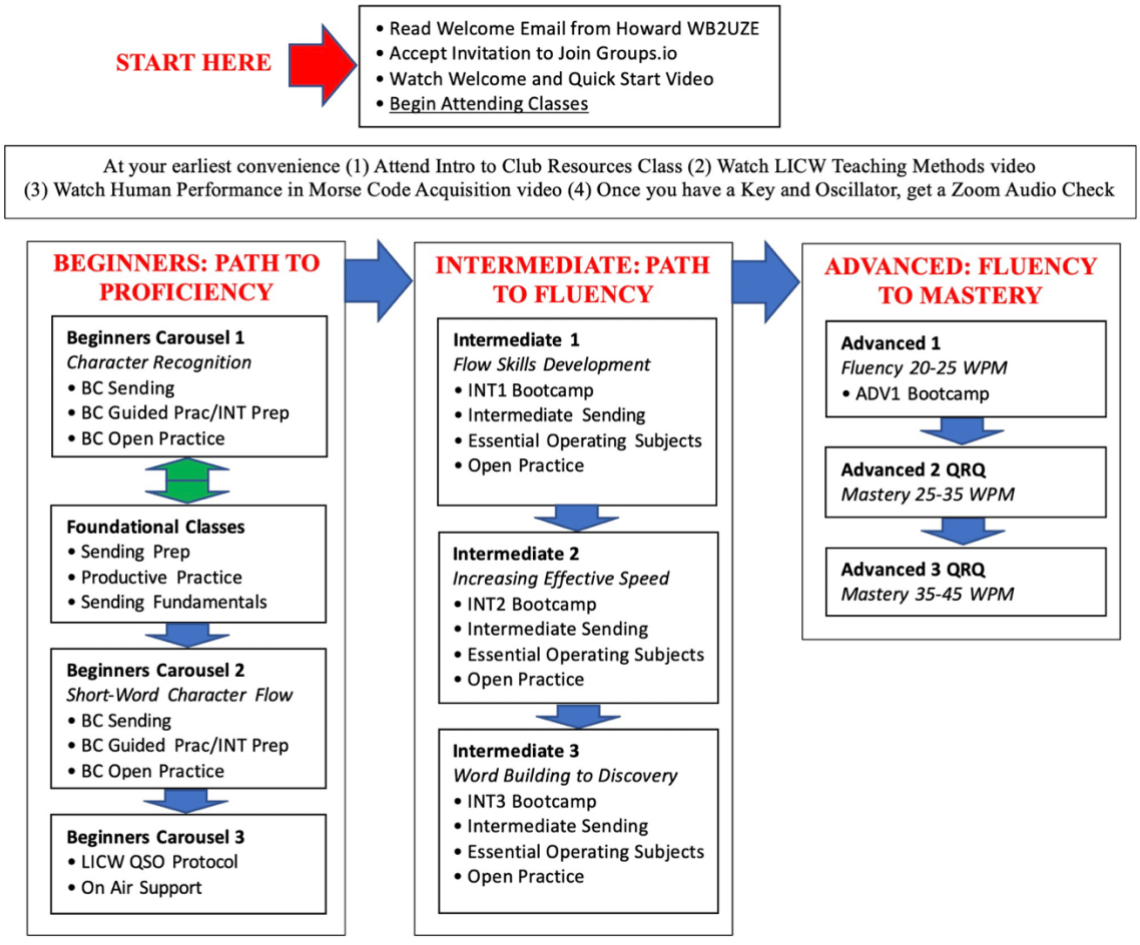
Rest and recovery are essential parts of the learning process. Sustainable progress requires pacing, consistency, and the avoidance of burnout. Students should understand that progress is rarely linear; periods of rapid improvement are often followed by plateaus or brief regressions. These are normal features of skill development, not signs of failure. The long-term goal is not intensity alone, but consistency supported by productive habits over time.

ACADEMIC PROGRESSION:

The LICW academic model is structured as a single continuous progression from early sound familiarity to foundational operating competence, then to conversational fluency and, for those who wish to continue climbing, into mastery.

The Beginners Carousel establishes correct sound-first learning habits, builds character recognition and early short-word flow, and prepares students for on-air operating. The Intermediate curriculum develops continuity, recovery, and increasing effective speed as students advance along the Path to Fluency. The Advanced curriculum consolidates conversational fluency and, for those who continue further, extends it into QRQ operation and the Path from Fluency to Mastery.

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



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.

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 accurate recognition of the 44 basic Morse characters as complete acoustic patterns.

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 or analytical reconstruction, but on hearing each character as a single sound unit. Sending is introduced early so that recognition, recall, rhythm, and motor production develop together.

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

Objective: Build the ability to process short character groups fluidly and begin forming common words and phrases.

As the full character set is completed, students begin moving beyond isolated character recognition into multi-character flow. Guided Practice and Intermediate Prep are especially important at this stage because they strengthen continuity, encourage recovery after misses, and acclimate students to the pace and structure of INT1.

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 no longer basic recognition. It is the development of 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 true beginning of flow-based learning. Students begin receiving Morse code in more realistic contexts, developing natural head sending, and cultivating Loose Focus. At this stage, the central challenge is no longer whether the student knows the characters, but whether the student can remain in the stream as those characters arrive continuously.

2. Increasing Effective Speed (INT2)

Objective: Improve cognitive efficiency rather than raw speed.

At this stage, progress depends increasingly on three interrelated mechanisms: Time To Recognize (TTR), Instant Flow Recovery (IFR), and Character Flow Proficiency. As recognition delay decreases, recovery becomes quicker, and continuity becomes more stable, Morse code becomes easier to process at higher speeds without a proportional increase in mental strain.

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

The central principle of the Koch report is that Morse code should be learned as complete acoustic patterns rather than by visual reference to a printed chart.

Koch explored several methods for helping new students internalize sound patterns and rhythm. In one experiment, students listened to code without being told which characters the sounds represented. Instead, they marked a sheet of paper each time they recognized a recurring acoustic shape. This exercise linked the rhythm of what was heard with the rhythm of the writing hand, reinforcing the natural flow of the code. LICW has incorporated this principle into the Beginners Carousel curriculum.

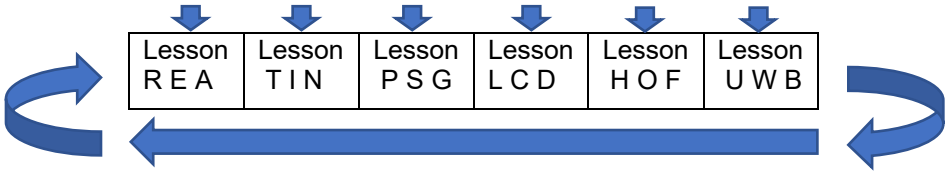
Koch also conducted sending and receiving experiments to determine the optimal character speed for learning. He found that speeds below 10 WPM prevented students from perceiving characters as complete acoustic patterns. Although his ultimate goal was 20 WPM proficiency, his method began by establishing initial proficiency at 12 WPM and then gradually increasing speed toward 20 WPM. LICW follows this recommendation by beginning at 12 WPM in the Beginners Carousel curriculum and advancing from 12 to 20 WPM in the Intermediate curriculum.

Koch also offered guidance on the sequence in which characters should be introduced. Following these principles, LICW developed a sequence based on the frequency of character use in standard QSO protocol. Characters that occur more often are introduced earlier, allowing students to integrate common QSO abbreviations and procedural elements into training from the outset.

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 **three new characters** using the Koch Method. When a new character is introduced, it is first played **without revealing its identity**. Students mark a dot on paper each time they recognize that recurring acoustic pattern. This reinforces the idea of hearing the character as a **single, complete sound unit** rather than as a sequence of dits and dahs.

Only after this recognition step is the sound linked to its corresponding character. From that point forward, students respond by **saying, writing, or typing** the character upon hearing it. This process is repeated for each new character introduced in the lesson.

After all new characters have been introduced, students practice sending them on a straight key or by verbalizing them to the instructor. This helps ensure that the characters are being recognized, recalled, and reproduced as distinct acoustic patterns rather than analytically reconstructed 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[3], NW6V.

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

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

- **“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:

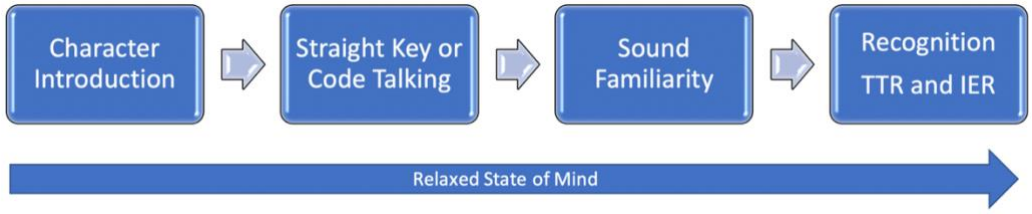
- **R** . _ . → **“di-DAH-dit”**
- **E** . → **“dit”**
- **A** . _ → **“di-DAH”**

Because Code Talking reflects the acoustic patterns of actual Morse code, it integrates naturally into early learning. It should be understood as a **bridge** to actual sending and receiving rather than as a substitute for them.

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 decoding habits. Over time, this kind of immersion helps Morse code feel increasingly familiar and natural.

CHARACTER FAMILIARIZATION:

Character sound familiarity is the foundation of accurate recognition. At LICW, the instructional priority is **familiarity first** - for as long as necessary - with the understanding that accuracy and speed will follow. This is a gradual, low-stress process built on repeated exposure, reinforcement, and deliberate practice.



In each lesson, **three new characters** are introduced using the Koch Method in a calm and unhurried manner. After introduction, students send the new characters on a **straight key** or verbalize them using **Code Talking** for the instructor. This helps ensure that the characters are being

recognized as **single acoustic patterns** rather than analytically assembled sequences of dits and dahs.

Following this, the instructor leads **character familiarization exercises** to reinforce the new sounds. This concludes the first portion of the class. Outside class, students continue familiarity practice until they develop strong confidence in recognizing the new character sounds. Only then should they transition to recognition exercises that place greater emphasis on **Time To Recognize (TTR)** and flow.

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.

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 tool at this stage because its simple ON/OFF action mirrors the signal structure of Morse code, making it the most direct and intuitive starting point.

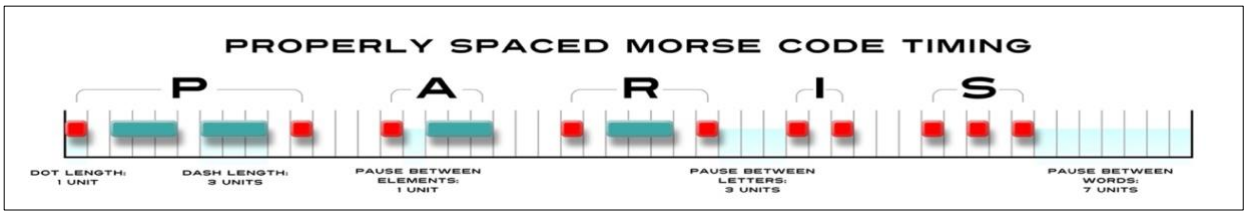
A central feature of BC Sending is practice against a standard so that errors are not repeated and reinforced. The LICW Morse Practice Page (MPP) is used for this purpose, with instructors guiding students through a simple progression: **hear a letter → say a letter → send a letter**. Real-time feedback 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[4] K4ICY illustrates properly spaced Morse code timing:

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

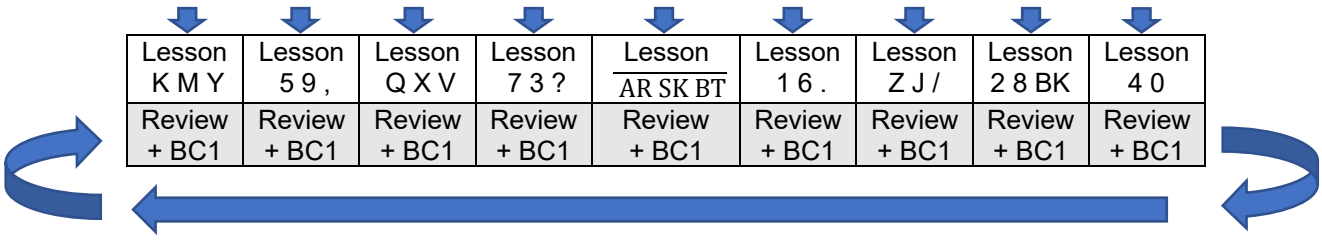


The Morse timing standard codified by the **ITU** and recommended by both **ARRL** and **LICW** is as follows:

- 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:



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.

Character speed remains at **12 WPM**, while effective speed increases to **10 FWPM (12/10)**. Based on Koch's findings, once students have learned to recognize Morse characters as complete acoustic patterns, it is no longer necessary to introduce new characters without revealing their identity. This allows for a more direct instructional approach.

The new characters introduced in BC2, combined with the 18 carried forward from BC1, allow students to begin forming common **QSO words and phrases**. This marks an important transition from isolated character recognition to multi-character flow and early word-level processing.

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 sustain rhythm, anticipate upcoming characters, and recover instantly from misses - the same skills required for a confident transition into the Intermediate curriculum, where longer word sequences become the norm.

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

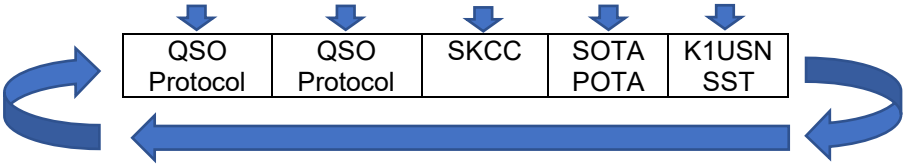
aligned with the curriculum, Open Practice is student-led. This gives participants the freedom to set the pace, choose the focus, and experiment with different approaches.

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.

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 endorses a set of training tools that support instruction, guided practice, and self-directed learning across all stages of the curriculum. These tools have been selected because they reinforce the club's academic goals, support productive practice, and help students develop skill progressively across the full continuous learning path of Morse code development - from early recognition and foundational operating competence, through conversational fluency, and, for those who continue climbing, from fluency to mastery.

Taken together, these resources provide students and instructors with a flexible practice ecosystem that supports character learning, sending, flow development, adverse copy preparation, on-air readiness, conversational fluency, and the continued extension of that fluency into mastery.

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.

The MPP supports both classroom instruction and self-directed practice. Whether a student is reinforcing new characters, refining timing, developing flow, building conversational fluency, or extending that fluency into mastery, the platform provides the structure and consistency needed for effective, measurable progress.

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, MorseCode.World serves as a valuable supplemental resource for practice, experimentation, and technical reference across all three major developmental phases of the LICW learning path, while also supporting accessibility and offline use.

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 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, BC2, and Kids Tier 1 at the time of this writing. 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 and supports screen readers.

The flashcard trainer uses a heat-based spaced repetition system (SRS), the first of its kind in CW instruction, and tracks both mastery of flashcards and response time for each flashcard. Using this data, the trainer also provides customized sending drills that focus on the student's most challenging material.

Lessons in structured courses use voice and CW to teach Morse sounds like the practice tapes of old. Each lesson includes a flashcard exercise that must be mastered before the next lesson is unlocked.

At the time of this writing, cwsignals.com is in alpha and is updated frequently as development continues. New features are in the works,

including a lexicon of prosigns, Q-signals, and abbreviations derived from source documents 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.

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.

Students typically enter Intermediate 1 proficient at 12 WPM and with some on-air exposure from 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.

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[5] and Andy Clark[6]) 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 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.

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

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[7], 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

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

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. "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:** Focusing heavily on isolated character recognition postpones exposure to conversational character flow, which is essential to 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 code fluency is not driven primarily by slow, meticulous character recognition in isolation. It is driven by increasing comfort with character flow, reducing TTR through repeated exposure, and strengthening IFR so that the stream of code continues uninterrupted.

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.

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.

INCREASING EFFECTIVE SPEED:

Increasing effective speed is not simply a matter of hearing faster characters. It is the result of increasing cognitive efficiency - how quickly and smoothly the mind can recognize characters, sustain flow, form words, and retain meaning without bottlenecks.

Within the LICW academic model, gains in effective speed arise primarily from three developments:

1. **Time To Recognize (TTR)**
   As TTR improves, characters are recognized more quickly and with less effort. This reduces cognitive drag and frees mental capacity for the next character, the emerging word, and the larger stream of meaning. Lower TTR supports smoother, more continuous copy and makes higher reception speeds more manageable.
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 recognition, recovery, and continuity. As these three mechanisms

strengthen together, Morse code becomes easier to process at higher speeds without a corresponding increase in mental strain.

TIME TO RECOGNIZE (TTR):

Time To Recognize (TTR) is the term LICW uses to describe the interval between the end of a Morse element and the moment of recognition. It replaces the earlier term **Instant Character Recognition (ICR)**, which implied recognition without delay and therefore did not accurately describe the actual recognition process.

In practice, recognition always requires some amount of time, even when that interval is very short. That interval varies according to familiarity, the nature of the material being copied, and the depth of prior exposure. Through **OverLearning** - repeated, deliberate exposure and practice - the goal is to reduce the time required to recognize what is heard, whether the unit is a character, abbreviation, or word.

TTR therefore provides a more accurate way to describe progress. Improvement is reflected not in perfection or immediacy, but in the gradual reduction of recognition time as familiarity, automaticity, and flow develop. In that sense, TTR serves as one of the clearest indicators of growing fluency within the LICW academic model.

Guidance for Applying TTR WPM Equivalents

The WPM equivalents associated with TTR are intended as reference points only. Their purpose is to illustrate how recognition time typically shortens as proficiency develops. They should not be treated as rigid benchmarks, but as a way of understanding the gradual shift toward easier, smoother, and more effortless copy.

The practical value of TTR is not numerical precision for its own sake, but the ability to observe how copying begins to feel more comfortable, more automatic, and less effortful over time. In that sense, the WPM equivalents function as illustrations of developing fluency rather than as performance targets in themselves.

		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:

Character recognition is foundational, but it is not sufficient on its own. Many students begin with isolated character drills, yet that approach becomes limiting once characters begin arriving in rapid succession and must be processed as part of continuous communication.

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 is treated as an essential stage in the progression from isolated recognition to

conversational Morse fluency. It is the mechanism by which Morse begins to function less as a sequence of separate symbols and more as a continuous stream of meaningful sound.

CHARACTER FLOW PROFICIENCY:

Character Flow Proficiency is the ability to recognize and respond to a continuous stream of characters accurately, rhythmically, and with minimal cognitive interruption. 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.

ANNOTATIVE VS. HEAD COPY:

At this stage of development, not all students are ready to rely primarily on head copy, and that is entirely appropriate. Writing while copying remains both normal and productive in the Intermediate curriculum.

Annotative copy and head copy should not be understood as opposing methods. In practice, they are complementary and are often used together. Writing is especially useful in situations with little contextual support or where accuracy is paramount, such as traffic handling, callsigns, signal reports, and other log-critical information. Head copy becomes increasingly valuable as continuity, context, and fluency improve.

Experienced operators often combine the two approaches, writing down only a few essential details while head copying the remainder of the exchange. Within the LICW academic model, the goal is not to force an early abandonment of annotation, but to support a gradual shift toward greater ease, continuity, and comprehension as fluency develops.

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 "Hear It, Send It" Works

When a student hears a character and sends it immediately, three reinforcing processes occur:

- The rhythm is heard
- The rhythm is produced
- The rhythm is confirmed through auditory feedback

This combination is powerful because it strengthens the sound-to-meaning link from more than one direction.

How Sending Reinforces the Three Pillars of Fluency Development

1. Time To Recognize (TTR) and the Acoustic-Motor Loop

Sending a character is a physical performance of its rhythm. As the hand motion becomes associated with the sound pattern, the learner develops a more reliable and faster pathway from sound to recognition. A useful practice strategy is to send at two speeds:

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

This helps prevent single-speed familiarity and supports recognition across more than one timing context. In this way, sending can accelerate reduction in TTR.

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.

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.

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 accelerate student progress within the LICW curriculum. Bootcamps are not stand-alone classes, and they are not replacements for

the core curriculum. They are accelerators designed to help students make important transitions into a new stage of learning.

Their purpose is to focus training on the specific skills, habits, and milestones needed to enter the next stage with greater confidence and effectiveness.

There are four tiers of OverLearn Bootcamp, each aligned to a key transition point along the Path to Fluency. Each Bootcamp is named for the stage of development it is designed to support. Informal subtitles are included to capture, in plain language, the central learning challenge of each transition.

Bootcamp emphasizes consistent, focused practice in both receiving and sending at higher speeds, with the goal of significantly reducing Time To Recognize (TTR), strengthening Character Flow, and moving students beyond conscious, slow, character-by-character decoding.

Through a structured regimen of drills, copying exercises, and guided repetition, students develop the speed, recovery skills, and mental endurance needed to function more effectively at the next level. The Bootcamp environment also fosters accountability, momentum, peer support, and enjoyment, helping students break through plateaus and prepare for the next stage of learning.

Unlike the more flexible format of the regular LICW academic tracks, OverLearn Bootcamp requires a higher level of commitment. Each Bootcamp includes prerequisites and requires twice-weekly attendance at live Zoom sessions over a four-week period, along with daily home practice.

Bootcamp works best when taken alongside the core curriculum as a focused accelerator, not in place of it.

OverLearn Bootcamp is designed not only to increase exposure to higher-speed character flow, but also to change how students listen. Its purpose is to help students decouple the emotional sting of missing from the physical act of listening. By normalizing misses, Bootcamp reduces the startle response that so often breaks continuity and pulls attention backward. In that sense, Bootcamp is not merely a speed accelerator; it is a deliberate intervention in the student's mental and emotional relationship to copy.

This shift is central to Project OverLearn. Traditional learners often approach Morse with a maximum-recognition mindset, in which the goal is to identify every character correctly and each miss is experienced as a failure. Bootcamp instead cultivates a flow mindset, in which the primary task is to remain in the stream, hear every character sound, and preserve forward momentum. Accuracy still improves, but it improves as a byproduct of continuity, repeated exposure, and growing comfort with the sound stream.

The Bootcamp Mental Shift

Traditional CW training often encourages a maximum-recognition mindset. In that model, the learner's primary goal is accuracy, misses are treated as failures, and attention is repeatedly pulled backward in an effort to recover what was lost. This can create a strenuous, perfection-oriented mental state that becomes exhausting and unsustainable as speed and density increase.

Bootcamp trains a different mindset. Its primary goal is not perfect recognition, but continuity of listening. Students are encouraged to hear every character, remain alert for recognition, and recover instantly from misses without looking back. The desired mental state is relaxed, attentive, and emotionally neutral. Within this framework, misses are normalized, continuity is preserved, and flow-based pattern recognition becomes increasingly reflexive.

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 Fluency Development

Within Project OverLearn, Bootcamp helps strengthen five closely related dimensions of fluency development. Each supports the development of the next.

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 or not full recognition occurs in the moment.

4. Time To Recognize (TTR)
Through repeated exposure to character flow, the time required to recognize characters, abbreviations, and words gradually decreases. Durable TTR gains are often achieved most effectively when flow is temporarily prioritized over immediate recognition success.

5. Subliminal Recognition
As CFP and TTR improve together, recognition begins to shift from effortful conscious processing toward high-speed pattern recognition. This increasingly automatic processing frees the mind to follow words, retain trains of thought, and comprehend meaning more naturally.

The Cognitive Shift: From Thinking to Knowing

One of the central aims of Bootcamp is to help students change how they listen, which in turn changes how the brain processes Morse code during flow. The greatest barrier to fluency is often the thinking gap: the effortful, character-by-character process of trying to decode each item consciously. That process is slow, tiring, and ultimately unsustainable.

Bootcamp works toward a different state: knowing. As Morse character sounds are overlearned as unified acoustic patterns, recognition becomes less a matter of active thought and more a matter of increasingly automatic pattern recognition. In this state, the learner begins to shift from deliberate decoding toward effortless comprehension.

The first step in that shift is learning to hear characters not merely as elements of dits and dahs, but as single acoustic sound units.

BOOTCAMP TIERS

The four tiers of OverLearn Bootcamp are aligned to major developmental transition points along the Path to Fluency. Bootcamp names are **destination-based**. Each tier is named for the level it helps students enter and strengthen, not simply the level where the student may currently be enrolled.

Each Bootcamp is best understood as an accelerator that supports both the **transition into a level** and the **early developmental work within that level**. For example, INT2 Bootcamp may be appropriate for a student nearing the end of INT1, preparing to enter INT2, or already in the early stages of INT2.

Bootcamps do not replace regular curriculum classes. They are short, focused accelerators designed to strengthen the mental habits, flow skills, and recovery behaviors needed for success at the next stage.

INT1 – Flow Foundations (Missing Isn't Failure)

Best suited for students approaching, entering, or newly working within INT1

This Bootcamp is designed for students who have completed the beginner character set and are ready to move beyond isolated recognition into real-time flow. Its purpose is to help students begin developing continuity, confidence, and recovery as they enter the first true stage of flow-based learning.

Its emphasis is not on perfect copy, but on remaining in the stream, tolerating misses without disruption, and learning to trust the sound flow even when recognition is incomplete. This Bootcamp helps students make the critical transition from controlled recognition toward the forward-moving mental posture required for Intermediate work.

INT2 – Effective Speed (Hear Every Character)
Best suited for students approaching, entering, or newly working within INT2

This Bootcamp is designed for students who already demonstrate emerging flow and are ready to improve cognitive efficiency rather than merely push for more raw speed. Its purpose is to help students reduce recognition delay, strengthen Instant Flow Recovery, and improve Character Flow Proficiency under increasing demand.

Its emphasis is on hearing every character sound, preserving rhythm, and decreasing the lag between hearing and recognition. As TTR falls and recovery improves, students become able to function more effectively at higher speeds without a proportional increase in mental strain.

INT3 – Word Discovery (Let Words Appear)
Best suited for students approaching, entering, or newly working within INT3

This Bootcamp is designed for students who are functioning with growing continuity at higher speeds and are ready to move beyond deliberate word building toward emerging word recognition. Its purpose is to strengthen the transition from conscious assembly toward the perception of larger meaningful units through rhythm, familiarity, and context.

Its emphasis is on sustaining flow under greater speed pressure and strengthening the mental processes by which characters begin to resolve into words and phrases. Students are encouraged to stop trying to construct every word manually and instead allow familiar patterns to emerge more naturally from the sound stream.

ADV1 – Conversational Fluency (Effortless Understanding)
Best suited for students approaching, entering, or newly working within ADV1

This Bootcamp is designed for students who can already maintain flow at higher speeds and are preparing to consolidate those gains into conversational fluency. Its purpose is to help students copy increasingly conversational material with less conscious effort, broader comprehension, and greater ease.

Its emphasis is on helping students sustain continuity across longer and less structured material, follow trains of thought more comfortably, and increase the degree to which Morse is experienced as language rather than as an ongoing decoding task. This Bootcamp represents the culminating Bootcamp stage within the Path to Fluency.

BOOTCAMP ELIGIBILITY REQUIREMENTS

Bootcamp eligibility is tier-specific. Because each OverLearn Bootcamp is designed to support a different transition point in the curriculum, readiness requirements vary by level.

All Bootcamps require students to have a sufficient foundation for sustained, high-repetition practice and the ability to participate consistently in a structured four-week training environment. In general, students should:

- Possess the foundational skills appropriate to the Bootcamp tier they are entering
- Be able to participate in fast-paced drills and guided repetition
- Be willing to tolerate misses, remain engaged, and continue forward rather than stop and reset
- Be prepared to attend twice-weekly live sessions and complete daily home practice

Additional readiness expectations are determined by the specific Bootcamp tier. Tier-Specific Guidance:

INT1 – Flow Foundations (Missing Isn't Failure)

Students should know the 44 BC Morse characters and be ready to move beyond isolated character recognition into early flow-based copying. This Bootcamp is intended for students who are beginning to encounter the challenge of real-time continuity and need support in developing confidence, recovery, and trust in the sound stream.

INT2 – Effective Speed (Hear Every Character)

Students should already demonstrate emerging short-word character flow and be able to copy beyond single characters with some continuity. They should be ready to reduce dependence on transcription, strengthen recovery, and improve recognition efficiency as flow pressure increases.

INT3 – Word Discovery (Let Words Appear)
Students should be functioning with increasing continuity at higher speeds and be prepared to strengthen word-level perception, sustained flow, and recognition of larger meaningful units as they move from deliberate word building toward word discovery.

ADV1 – Conversational Fluency (Effortless Understanding)
Students should already be able to maintain flow at higher speeds and be ready to develop broader comprehension, deeper word discovery, greater endurance, and increasing cognitive fluency with decreasing conscious effort.

Class size is limited to 25 students in order to preserve an effective student-to-instructor ratio and provide each participant with meaningful guidance and support.

For additional detail on Bootcamp goals, structure, and expectations, instructors and students should refer to the *What Is Bootcamp* document and the *Bootcamp Student Guide*.

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 sessions are intentionally light, enjoyable, and celebratory, while remaining grounded in the core principles of Project OverLearn: rapid recognition, continuity of flow, immediate recovery after misses, and growing comfort at conversational speeds.

The purpose of Capstone is not to introduce a new layer of curriculum, 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 the gains achieved in Bootcamp, strengthen their sense of progress, and carry the Bootcamp mindset back into the regular curriculum and on-air operating.